FOOD ENGINEERING

July 1951

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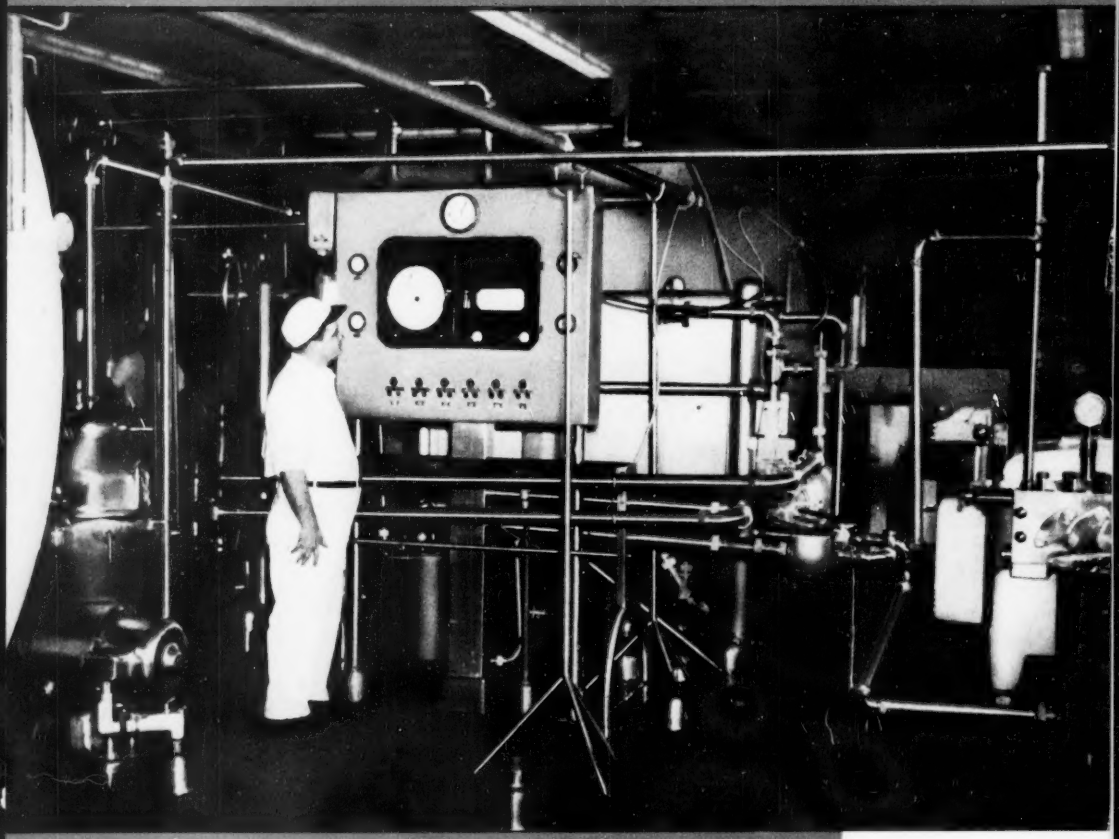

Automatically controlled pasteurizers expedite continuous flow of milk in "world's most modern dairy." Report, p. 60

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To Boost Efficiency, Output and Quality

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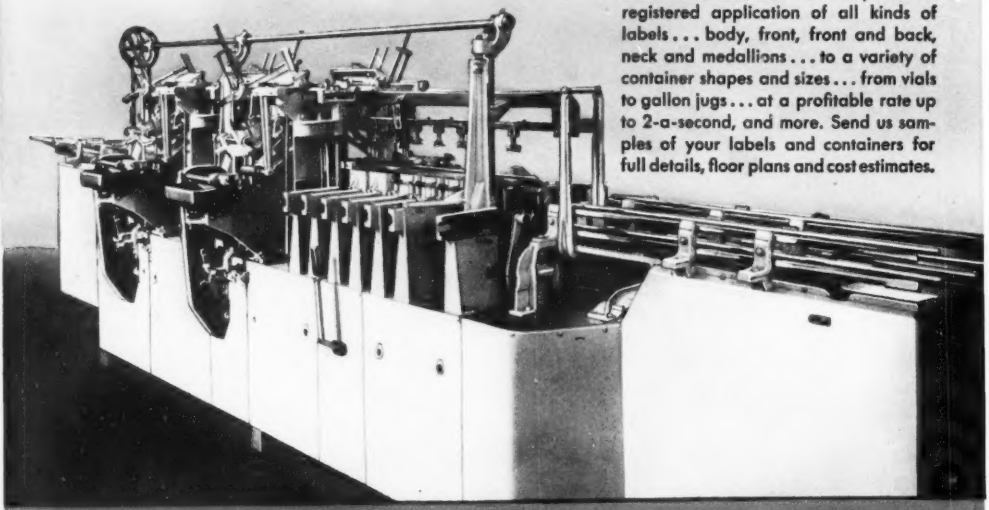

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Food Engineering

Volume 23 JULY, 1951 Number 7

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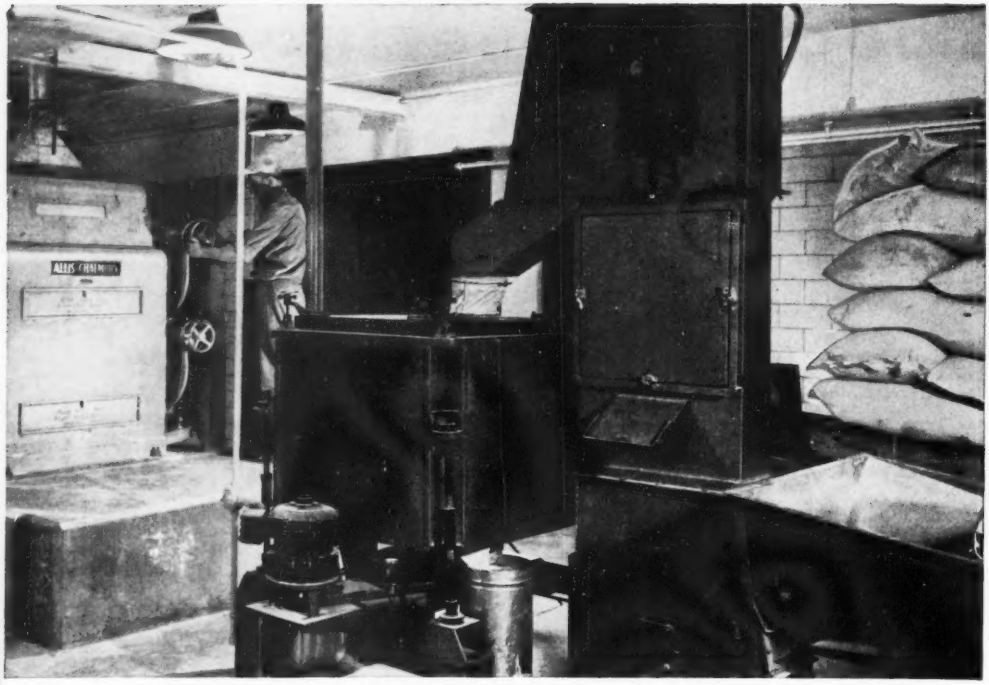

HERE'S A Profit-Producing COMBINATION!

LOW-HEAD Gyratory Sifter and A-C Roller Mill Help Produce Tasty "Cream of Rice" Breakfast Cereal

THIS PROFIT-WINNING TEAM has been in operation for a year and a half at Grocery Store Products, West Chester, Pa. Specifically, the sifter and roller mill have been used for grinding and grading of rice — to a very narrow size range — for "Cream of Rice" breakfast cereal.

Performance records indicate that these Allis-Chalmers machines have provided trouble-free, economical operation since their installation. Routine cleaning and lubrication has been the only maintenance required.

Both machines are of sanitary, all-metal construction — designed for easy cleaning. Sifter is fitted with rubber seals and the roller mill operates under negative air pressure — factors that *minimize* chance for dust buildup in the immediate area of these machines.

But before *any* equipment was purchased, Allis-Chalmers conducted tests in its own research lab — grinding and sifting rice, getting *exact* granulation desired. As a result of these tests, the customer was given the equipment best suited for his particular application.

You, too, can benefit by calling on Allis-Chalmers for food processing equipment or for special milling research on any material you may have. Get full details from our nearby A-C sales office—or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3275

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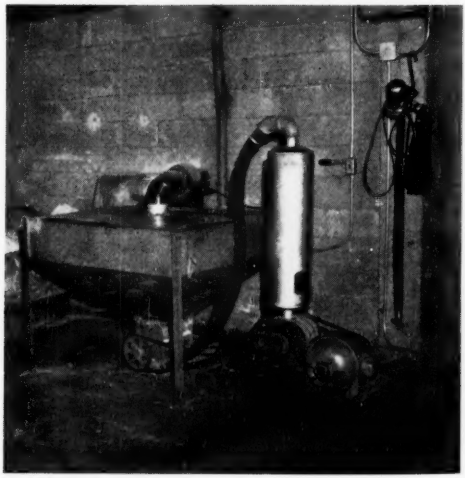
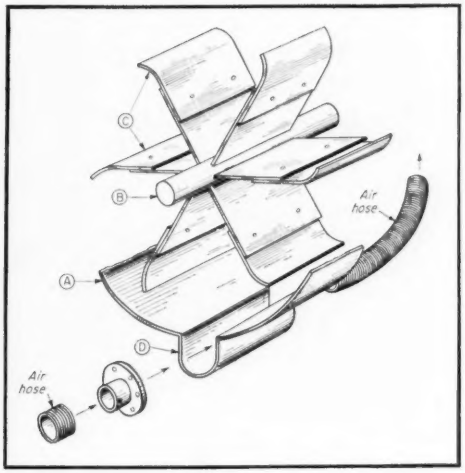
PRACTICAL IDEAS





Insulation Blower Now Handles Corn

Tubular blowing equipment, taken from a service truck used by an insulation company, has been successfully converted to a practical materials handling system.

This new system (photo) has served to improve product quality, up plant cleanliness and effect savings in labor.

What led to the new method was an existing problem involving product quality. Among our products are packaged popped corn and corn kernels, the latter for both consumer and industrial use. We have learned from experience that if the moisture content of the corn is below 12½ or above 14 percent, an excess of unpopped kernels results. Moisture content at 13 percent is ideal.

Tests of our packages indicated an excess of unpopped kernels due to moisture loss or gain through abrasions of the coating of the kernels. We found that the source of these abrasions was our materials handling system.

In our operations, we hand-trucked bags of corn from the basement to the floor above. Here, we dumped them into the boot of a bucket elevator, which then conveyed them to the top of our packaging machines. We traced the abrasion trouble to the bucket elevator.

We remembered that during the war, when new delivery trucks were almost unobtainable, we had purchased used trucks wherever we could obtain them. We had then rebuilt them for our own needs. Among these vehicles was one which had been used by a house insulating company. The machines for blowing the insulation and the flexible rubber hose were still on the truck.

We converted this equipment into a materials handling system for our popping corn kernels, and our abrasion problem was solved. Of course, we had to make some changes and adjustments. This is how the new system works:

Kernels are emptied into a hopper (see photo) just high enough for convenient dumping and large enough to hold as many as 6 bags. At the bottom of the hopper is a rounded regulating compartment (A in sketch) in which a shaft (B) rotates. Six plates tipped with rubberstrips (C) are attached to the shaft, paddle wheel style. As these plates turn they seal off, from the hopper above, a cylindrical chamber (D). Compressed air from the blower is forced through this chamber.

The rotating rubber-tipped blades supply a uniform amount of kernels to chamber (D). Here, the kernels are picked up by the air stream and conveyed through rubber air hose to the intermediate hopper mounted on the filling machine. Chaff and dust are exhausted by a suction blower on top of the intermediate hopper.

This system has three advantages over the former method: Kernel abrasions are reduced, meaning a better product, labor requirements are less; and chaff and dust are minimized in the package and on the packaging floor.—*L. C. Poyel, Technical Director, Red Dot Foods, Inc., Madison, Wis.*

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

MAY PRACTICAL IDEA voted best was "Freezer Converted to Cooker," submitted by Frank V. Kosikowsky, Dept. of Dairy Industry, Cornell Univ., Ithaca, N. Y. It described how a small, inexpensive cheese cooker can be devised from a direct-expansion ice cream freezer.

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to manufacturers with drying, cooling or roasting problems...

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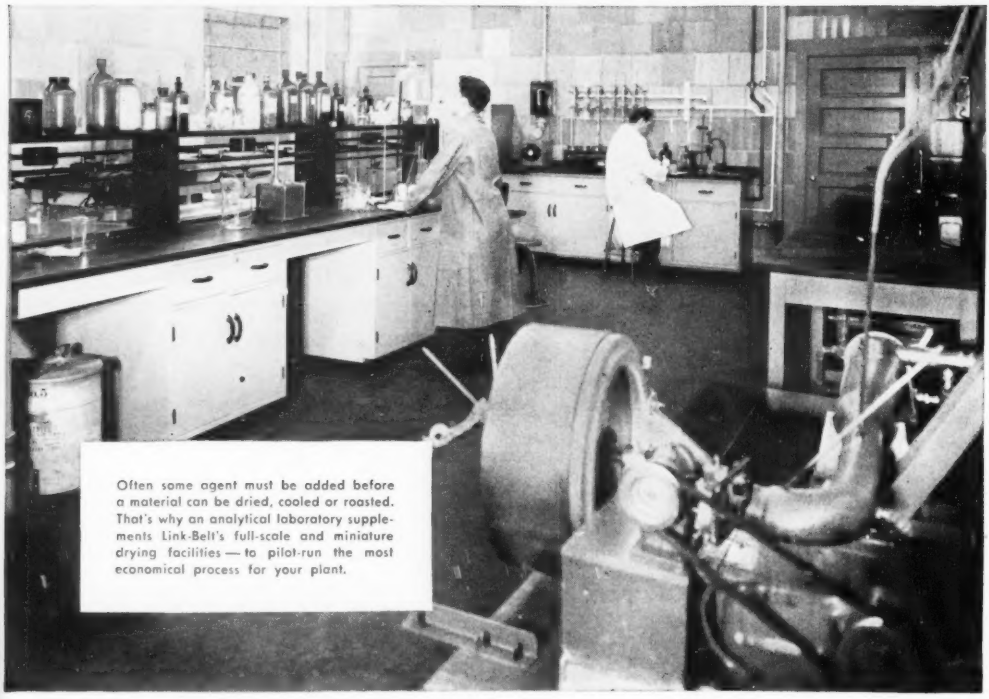

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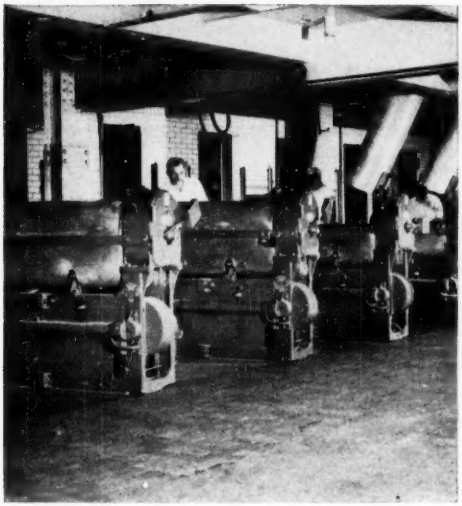
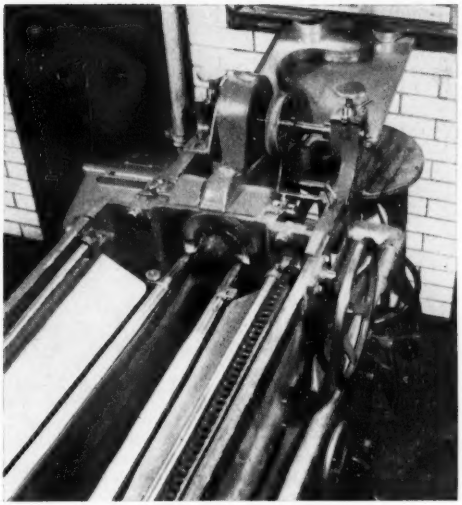




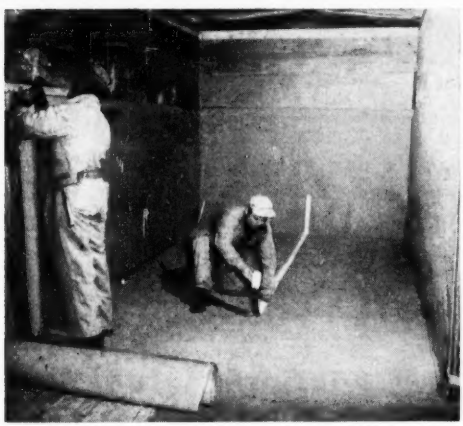
Toffee Spinner Does Hard-Candy Job

A machine heretofore used only for spinning toffee and caramels has now proven successful in spinning hard candies.

Pictured above are part of a group of twelve of the units—Rose Horizontal automatic batch rollers—which for the past 18 months have been capably handling hard candies at the Charms plant, Bloomfield, N. J. The rollers gently spin the candy into rope form prior to its entry into the forming and wrapping machines.

Comments Ross B. Cameron, Charms vice-president: "It has enabled us to operate the forming machines at a faster rate, while at the same time it makes a more uniform product with little or no physical effort. The savings in time and labor have more than repaid the cost of this equipment during the short period of time it has been in operation."

In operation, the machine feeds the rope by means of intermittently revolving conical-shaped rollers, supplying heat by means of electricity or steam, and discharges through rollers set to give the desired rope diameter (photo right). With a 1 hp. drive motor, each machine takes up only 24 sq. ft. of floor space and handles approximately 100 lb. batches.—*American Machine & Foundry Co., New York City.*



Speedy Method of Rejuvenating Cars

With $5 worth of asphalt-laminated paper and 20 min. of labor, an unsuitable box car can be lined to meet requirements acceptable for the shipment of foods in multiwall bags.

And with complete lining, a car can be used for bulk loading with no loss of product or contamination. In fact, even cars with rough and greasy floors can be satisfactorily lined.

The liner our company uses consists of two sheets of No. 35 kraft paper cemented together with asphaltum and reinforced with rayon thread in a 2-in. diamond pattern. After lamination, the sheets are given additional strength by a water crepeing process. This liner is oil and grease resistant, does not crack or deform when the thermometer drops, will withstand temperatures up to 280 deg. F. without bleeding, and is waterproof.

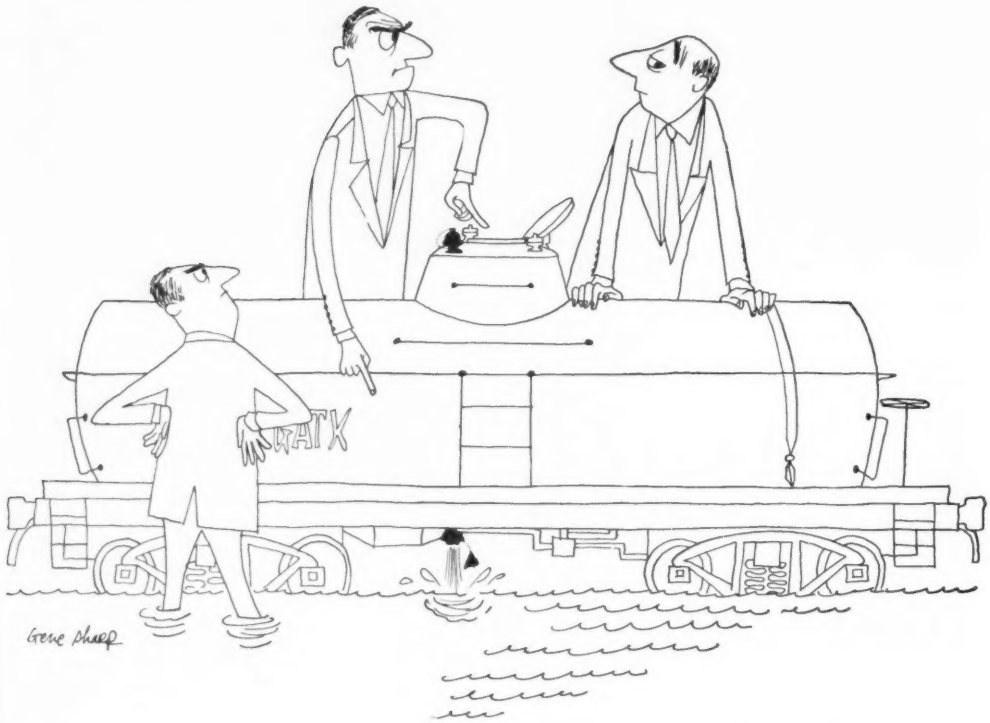
Having a tensile strength of 40 psi. and an 18 percent minimum stretch, the sheet can "take" a right-angle turn by a lift truck with a 2-ton load without tearing. One liner may last for as much as a dozen trips.

As for coverage, one roll (164 ft. long by 62 in. wide) is enough for two boxcar floors or the floor and halfway up the sides and ends of one car. Width of the liner allows a center overlap and a 6-in. foldup at the sides. A special cloth tape is used to seal the overlap and attach the liner to the car sides.

Holes in the floor or sides, splintered sections, or metal patches are covered with small pieces of liner spotted in place by tape or staples before the floor and sides are laid. Any tears which may start in the liner cannot travel more than 2 in. in any direction. They end when they reach the diagonal reinforcing threads.

Our company found use of this liner—supplied by J. J. Lipp Paper Co., Chicago—very economical. For when bags of product are worth $8 and more, tearing of them in unlined cars can represent a serious loss. Moreover, this

THE CARE AND NURSING OF TANK CARS



Always load a car with the outlet valve cap off so that if the valve is leaking, the leak will show up immediately.

Another way to get more from your GATX tank cars

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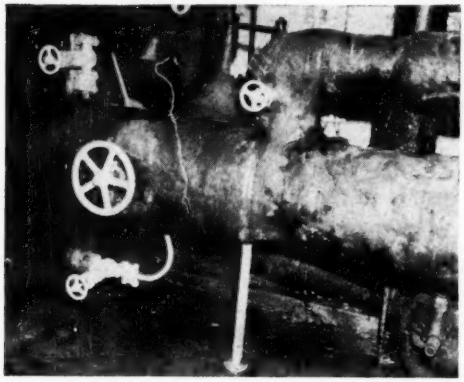
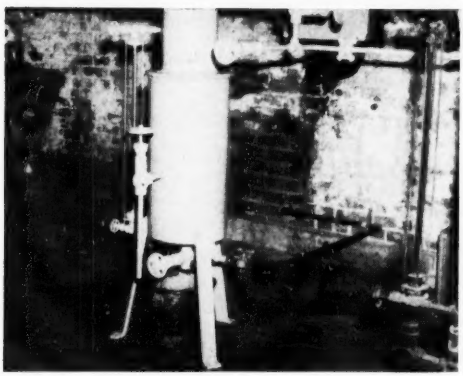
lining practice enables us to get an ample supply of suitable cars when Grade A cars are scarce. Time and labor are saved, and shipments move more promptly.

Customers appreciate the use of the liners and speedy service.—*American Maize Products Co.*





Easy Removal of Sludge From Ammonia

An unpleasant task—cleaning out oil, sludge, and other foreign matter from the ammonia system—has been done away with by the installation of a simple still in the Jacob Ruppert brewery, New York City.

In the old method of removing the foreign matter, a bucket was simply placed under the valve at the bottom of the liquid ammonia tank and the valve then opened. This method was always accompanied with the release of ammonia fumes, resulting in unfavorable working conditions causing illness among some of the employees.

The condition was corrected as follows:

A pipe line was installed from the bottom valve on the ammonia tank (upper photo) to a small steam-jacketed still. Now, when the sludge is to be removed, the bottom valve is opened and a small amount of ammonia is run from the tank to the still.

Here, the steam provides the required heat to vaporize the ammonia which is returned to the system as a gas. After the ammonia has been returned, the sludge is collected (lower photo) in a bucket placed at the bottom of the still.—*Wm. E. Paquette and Wm. Geide, Chief Operating Engineer and Assistant Operating Engineer, respectively, Jacob Ruppert brewery, New York City.*

Novel System Solves Tie-in Problem

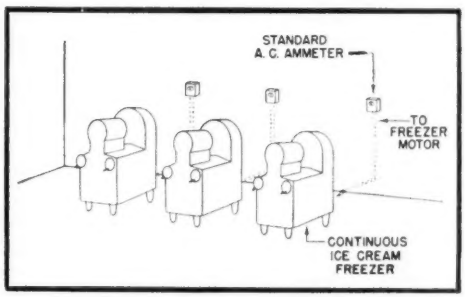
Use of Cello-Seal bands and a rapid method of drying them solved the problem of binding together two jars of condiments into a single combination package for G. F. Heublein & Bro., Inc., Hartford, Conn.

Object of the dual-package was to introduce the company's new product, A-1 mustard, through a combination sales campaign.

Here's how the job is done: Girls stationed alongside a belt conveyor first assemble jars into pairs—sauce and mustard. Then as the jars travel along the belt, other girls place the bands over both jars. Bands are set about 1-in. from the bottoms of the jars.

Continuing on the same belt, the paired jars pass into a heating tunnel (photo). Here, the band dries and at the same time shrinks, forming a tight fit securely binding the two jars together.

The tunnel is 8-ft. in length and has asbestos panel covering. Heat is supplied electrically from resistance wires on both sides. The tied-in jars are then packed into shipping cases.—*F. L. Jacobs, Chief Quality Control Chemist, G. F. Heublein & Bro., Inc., Hartford, Conn.*

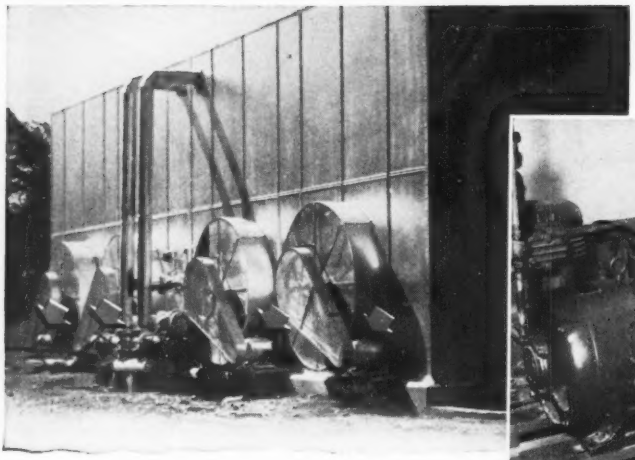


Ammeter Aids in Freezer Performance

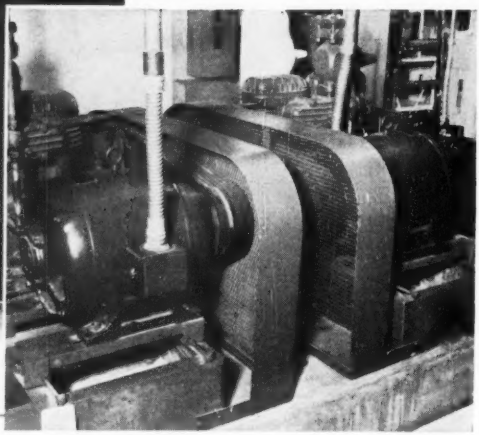
Installation of standard ammeters in connection with individual freezers has been found, by several ice cream manufacturers, to improve machine performance and to help in maintaining high product quality.

As for installation, the ammeters preferably should go on the wall, and far enough away from the freezers to be free from any vibration and from any corrosion effect of the ammonia fumes. It is specifically noted that the instruments should not be mounted on the freezers.

When properly installed so that the operator can readily



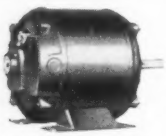
Four Century 5 horsepower splash proof motors driving fans.



Two Century 30 horsepower motors driving refrigeration compressors.

Century

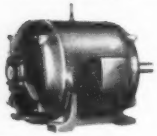
TYPE SC-
SQUIRREL CAGE MOTORS



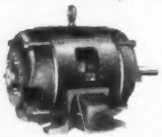
⅛ to ¾ horsepower

1 to 1½ horsepower

2 to 15 horsepower



20 to 125 horsepower



150 to 400 horsepower

Equipment Producers Select Century Motors

To Give You Long-Life Performance With Least Down-Time

The correct selection of the right combination of motor type, speed, power, torque, frame and mounting keeps Century motors on the job.

Team work between your motorized equipment producers and Century motor engineers means that you always get the right motor—selected from Century's wide range of types and kinds, in sizes from ⅛ to 400 horsepower for single or polyphase alternating current and direct current. You can be confident that you get top performance from the fine equipment these motors drive.

Skillful application makes sure that Century motors meet the exacting requirements of the machines they drive. That's your assurance of dependability.

CENTURY ELECTRIC CO. 1806 Pine St., St. Louis 3, Mo.
Offices and Stock Points in Principal Cities

Century Electric Company is celebrating its 50th year in the electrical industry.

CE-690R

Specify Century C MOTORS for all your electric power requirements

read the dials, the following benefits can then be expected:

A. As an ammeter measures the motor load, it gives an indication of the stiffness to which the ice cream is being frozen. Freezing to the same stiffness daily assures a more uniform product.

B. Operator soon learns the ammeter reading at which freezer performs best for a given product and discharge piping hookup. Reading indicates total power load resulting from scraping, stiffness of product, pumping pressure, and discharge pipe-line friction. Power and operation penalties of unnecessarily long or complicated ice cream discharge lines are detected by the ammeters.

C. These units are an aid in getting more uniform operation in a battery of freezers.

D. Operating difficulties can be more readily detected in the following seven ways:

1. If the ammeter starts kicking back and forth, it probably indicates that blades are not scraping properly and should be resharpened.

2. If ammeter shows freezer load is dropping, and it is more difficult to freeze stiff, it indicates reduced heat transfer. (Example: Ammonia cylinder may be coated with oil and need cleaning.)

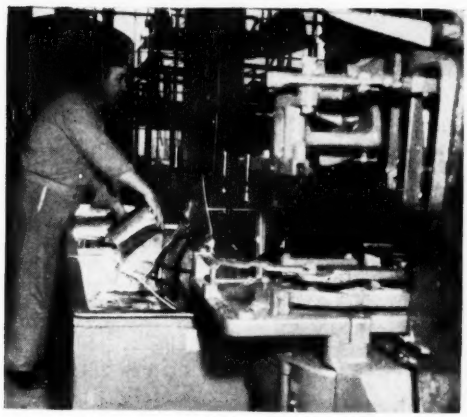
3. If ammeter shows freezer load is high, but it is more difficult to freeze stiff, it indicates high load because of mechanical difficulties. (Example: Worn mutator bearings causing poor scraping.)

4. A sudden drop in reading means freezer probably starved for liquid ammonia.

5. A sudden rise in reading: Freezer probably running out of mix.

6. Unit can also help in getting proper setting for the warning buzzer.

7. And it can aid in minimizing danger of freeze-ups during operation.—*From item in "Circle", house organ of Cherry-Burrell Corp., Chicago 6.*



Gage of Water Protects Quality

Uniformity of a finished, reconstituted beverage will, of course, be adversely affected by variations in the strengths of the concentrates. Thus, a risk arose when Nedick's employed a rinse water to assure more efficient emptying of original containers of concentrates—but adoption of a special water measuring system quickly solved the particular problem.

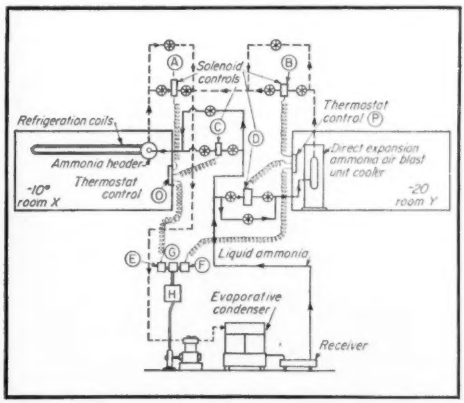
The technic involves metering the filtered rinse water needed to fully recover all of the viscous concentrate from the cans.

The production line starts with a mechanical can-opener. This machine removes the tops of the gallon cans of concentrate from which the blends are prepared. Opened cans slide down a twist which empties the contents into a stainless steel trough. Concentrate is pumped from the receiving trough through a magnetic separator to blending-holding tanks. The magnetic separator removes any bits of metal resulting from cutting the can lids.

Being viscous, the concentrate drains slowly and never completely. Adhering concentrate must be rinsed from the cans. Whatever water is used to wash out the cans dilutes the concentrate in the trough and must be accounted for in reconstituting the beverage in the blending tanks. This is the procedure:

After the cans have drained for a time, they are held manually over spray heads to remove the remaining concentrate from the cans. Filtered water used at the sprays is supplied in measured amount to the blending tanks on the second floor.

Foot pedals control the water to the sprays, so that water squirts from them only as needed. This water, having passed through the meter, is accounted for as part of the water required for reconstituting the concentrate. The method has proven both sanitary and efficient.—*E. F. Hansen, Production Manager, Nedick's Inc., New York City.*



Single Compressor Does Dual Job

Two refrigerated rooms are held at different temperatures with use of a single compressor by a method practiced at the Lehigh Valley Dairy, Allentown, Pa.

How the system is hooked up is shown in the sketch above. It works as follows:

After satisfying the temperature demands determined by the setting of thermostat (O), solenoid control (C) stops the flow of liquid ammonia to the header in room (X). Solenoid control (A) closes a valve on the suction line to the compressor. Control (E) goes to the "off" position. The compressor continues to operate, supplying refrigerant to room (Y) only.

When the temperature of that room is satisfied, as set on thermostat (P), solenoid controls (D) and (B) operate to stop the flow of refrigerant. Control (F) goes to "off". When (E) and (F) are both at "off", control (G) functions to open switch in switch gear box (H) which stops the motor.

When either room requires additional refrigeration, controls (E) or (F) go to "on" and the compressor starts supplying refrigerant to the unsatisfied room.

better measurement and control of

HUMIDITY

Ever since the origination of accurate humidity control by Foxboro, this Company has been foremost in the development of instrumentation for absolute humidity, relative humidity, moisture content and dew point . . . whether in gas, air, bulk materials or moving sheet stock. The high quality standards and complete diversity of Foxboro Instruments . . . backed by Foxboro's broad experience . . . offer you unmatched facilities for obtaining the most efficient system for your operation.

INDICATORS • RECORDERS • CONTROLLERS

hygroscopic, wet-and-dry bulb, capacitance, plus the unique "Dewcel" system for continuous recording and control of either absolute humidity or dew point.

TRANSMISSION SYSTEMS • CONTROLLED VALVES

FOXBORO

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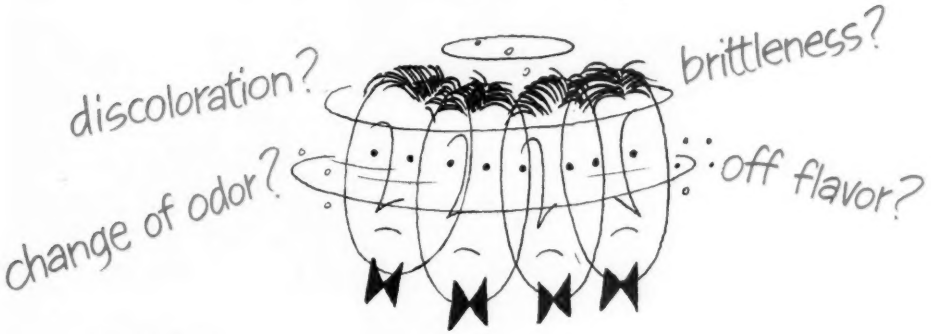
For over 40 years, specialists in the measurement and control of temperature, pressure, flow, liquid level, humidity . . .

THE FOXBORO COMPANY, FOXBORO, MASSACHUSETTS, U. S. A.

-troubled with:



Beef Tallow
Butter Fat Concentrate
Cereals
Chewing Gum
Chicken Fat
Citrus Oils
Cookies
Cosmetics
Crackers
Dog Food
Essential Oils
Fish Meal
Lard
Monoglycerides
Nuts
Oleo Oil
Paper Board
Potato Chips
Premixes
Spices
Vitamin A
Wax

Many food and associated products are subject to deterioration by the action of the oxygen in the air. Such deterioration is frequently revealed in the form of a discoloration, brittleness or a change in odor or flavor. If problems such as these arise in connection with any of your products, either during or after manufacture, and the cause is oxidation, Tenox, an Eastman food-grade antioxidant, may well be the answer.

The addition of small quantities of Tenox materially retards the reaction which takes place between any susceptible or unstable ingredients and oxygen. Because Tenox is stable at high temperatures, it can be added at the most convenient point in your processing procedure. Since the oxidation reaction is accelerated by a rise in temperature, this point is usually prior to the application of heat.

The effectiveness of Tenox in retarding oxidative deterioration has been proven in those products listed in the column on the left. What about yours?

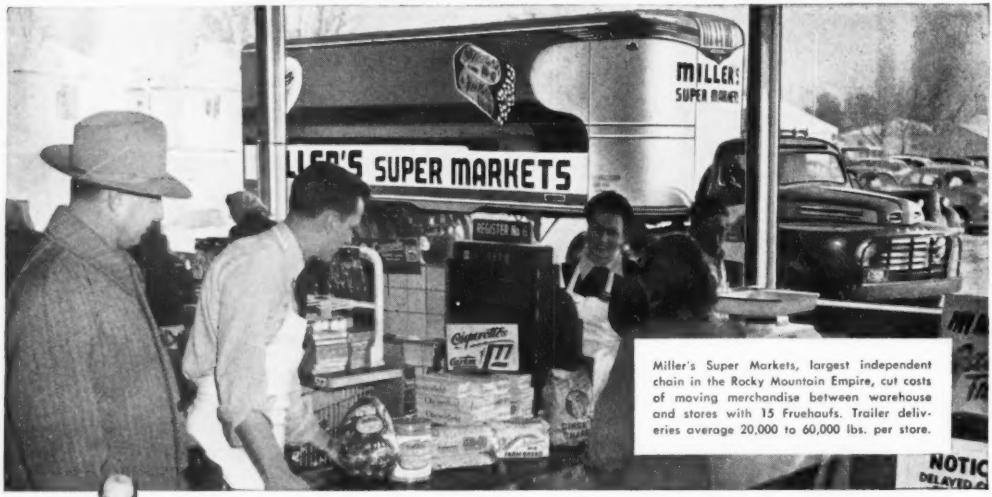
We will be pleased to send you additional information and sample quantities* of Tenox for your evaluation. Our laboratories are staffed and equipped to test the effectiveness of Tenox in various food and associated products. We welcome your problems. Write to Chemical Sales Development Department, Tennessee Eastman Company, division of Eastman Kodak Company, Kingsport, Tennessee.

Tenox Eastman Food-grade Antioxidants

SALES REPRESENTATIVES: New York—10 E. 40 St.; Cleveland—Terminal Tower Bldg.; Chicago—360 N. Michigan Ave. **West Coast: Wilson & Geo. Meyer & Co.,** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Seattle—1020 Fourth Ave., So. **DISTRIBUTED IN CANADA BY:** P. N. Soden Company, Ltd., 2143 St. Patrick St., Montreal, Quebec.

*We regret that samples of Tenox can be sent only to companies or individuals in the United States, Canada and Cuba.

TRAILERS TRIM COSTS for TODAY'S BIG "SUPERS"!



Miller's Super Markets, largest independent chain in the Rocky Mountain Empire, cut costs of moving merchandise between warehouse and stores with 15 Fruehaufs. Trailer deliveries average 20,000 to 60,000 lbs. per store.

Paul Cohen, Supt. of Warehousing & Transportation, Miller's Super Markets

"WE MOVE TWICE AS MUCH... TWICE AS FAST... AT HALF THE COST... WITH TRAILERS"

"IN OUR OPERATION, every step taken to trim distribution costs enables us to pass extra savings on to our shoppers.

"We've *doubled the volume and speed* of our deliveries and *trimmed our operating costs in half* by 'trailerizing' our truck fleet," reports Paul Cohen, Supt. of Warehousing & Transportation, Miller's Super Markets, Denver.

"Our Fruehauf Aerovans were placed in service in 1946. Other than regular maintenance, periodic painting and negligible repairs, not a penny has been spent on these units in 5 years of steady 6-day-a-week operation.

"Our refrigerated Aerovans hold their temperatures — protecting the appetizing goodness of our daily-fresh edibles.

"Not only do we consider our Fruehauf Trailers essential to our operation, but we feel this fleet of handsome 'rolling billboards' is a major advertising asset."

The food field is just one of over 100 different industries — businesses large and small—finding in Fruehauf Trailers the way to faster, lower-cost distribution. It will pay you to investigate their application to your business.

Write today for Fruehauf's *free* "Transportation Cost Analysis." The Fruehauf Trailer Co., 10956 Harper Ave., Detroit 32, Mich.

FOODS GET BETTER RIDE!—Exclusive Gravity-Tandem Suspension gives loads a level, cushioned ride. Self-steering action saves tires and fuel . . . cuts product damage. *Users get up to 4 times normal tire service!*

FOODS GET BETTER PROTECTION!—Exclusive integral-frame construction gives greater strength with less weight . . . for bigger load capacity. Trailer is engineered throughout for long life with low upkeep.

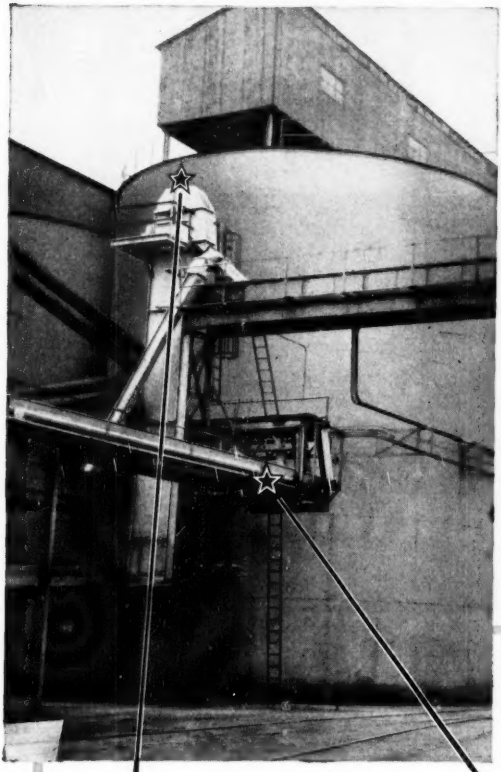
FRUEHAUF *Trailers*

World's Largest Builders of Truck-Trailers

YOUR FOOD — and almost all your daily living necessities — are brought to you all or part way by Trucks and Trailers. They make up Motor Transport — our nation's largest transportation system — employing 1 out of every 7 American people.

MATCH YOUR JOB of Materials Handling...

with LINK-BELT Bucket Elevators and Screw Conveyors



LINK-BELT offers you the most diversified line of both... plus wide engineering experience

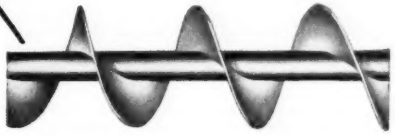
MOVE bulk materials with top efficiency. Choose your bucket elevators and screw conveyors from the complete Link-Belt line . . . engineered to meet your exact requirements.

For maximum results — different materials and varying conditions require specific types of materials handling equipment. That's why Link-Belt builds many types and sizes of enclosed conveying equipment . . . the *widest range* of bucket elevators and screw conveyors.

When you need bucket elevators or screw conveyors . . . choose them from the most diversified quality line on the market. Call in Link-Belt, the world's leading manufacturer of elevating and conveying machinery.

Midwest soybean oil mill uses several combinations of Link-Belt Bucket Elevators and Screw Conveyors to insure smooth flow of beans throughout process.

Centrifugal discharge bucket elevator runs at high speeds for high capacities. Suitable for most materials.



Helicoid or Sectional Conveyor Screws — for general screw conveyor applications, — may also be furnished in the metal and finish best suited to your purpose and with components selected from the most complete line.

LINK-BELT

BUCKET ELEVATORS AND SCREW CONVEYORS

LINK-BELT COMPANY: Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

12,340-A

makes mincemeat out of old production schedule

Thirty minutes per batch was the time schedule on mincemeat cookers at this eastern food plant . . . but that was **before** they replaced old-type traps with Yarway Impulse Steam Traps.

Now it's 15 minutes—one-half the time—and the plant superintendent is so enthusiastic over the production increase that he is personally spreading the news about Yarways to other plants.

A good record? Yes—but not unusual for Yarway. Yarway traps are **designed** to increase production—by sending the most pr[illegible]um B.T.U.'s at top temperatures into your process or product. **They get equipment hotter, sooner . . . and keep it hot.**

Small size, easy installation, good for all pressures, dependable operation, low maintenance and low cost are other reasons why over 750,000 Yarway Impulse Steam Traps have already been installed in plants everywhere.

It's easy to buy Yarways . . . 216 industrial distributors stock and sell them. One is located near you.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

NEW TRAP SELECTOR—New 20-page book tells you the right steam trap for any specific application. Write for your free copy.

YARWAY

the steam trap designed with production in mind

faithfully reproduced!

In the instance of cocoanut flavor, Alva research has developed a basic formula which is obviously an improvement over similar commercial products.

This prime Alva formula has been successfully adapted in the development of imitation cocoanut flavors specifically designed for use in candies, ice-cream, baked goods and desserts.

Samples of Alva imitation cocoanut for your paticular use will be sent on request. Let us also send you the complete Alva catalog of flavors for all uses.

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Better Coloring with BETTER COLORS

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CERTIFIED FOOD COLORS

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These pure food colors are manufactured by Sterling's Hilton-Davis Chemical Co., leaders in the color field for 25 years. Their experience and know-how guarantee the production of top quality certified food colors.

WRITE TODAY for new booklet giving information on Sterwin's complete line of Food Colors.

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More Miles in the Life of Your Trucks

Trucks with Eaton 2-Speed Axles "make time", not only on the open highway, but in city traffic as well. Even more important, Eaton 2-Speed Axles save wear-and-tear on engine and power transmitting parts; keep trucks in service, and add thousands of miles to vehicle life. Many exclusive features combine to give Eaton axles long life with minimum maintenance cost. Planetary gears distribute loads over several gear teeth, dividing the stress. Positive lubrication, even at slow speeds, reduces friction wear. Ask your truck dealer to explain how Eaton 2-Speed Axles pay for themselves over and over.

EATON
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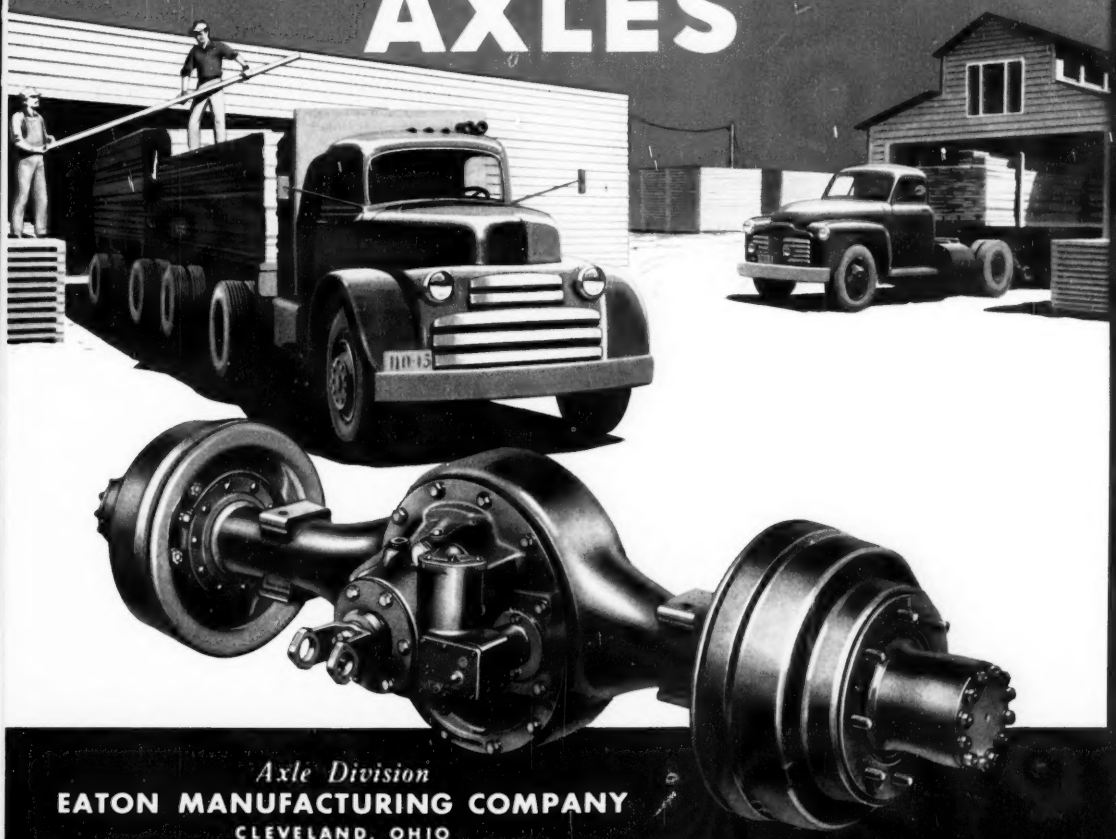

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EATON MANUFACTURING COMPANY
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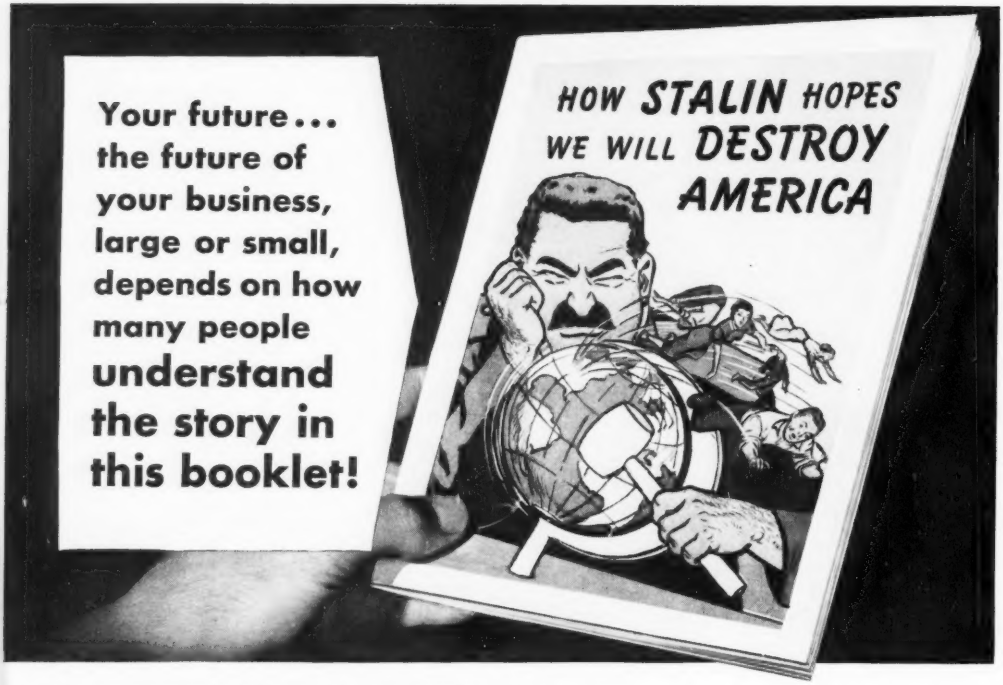
There IS something YOU can do ABOUT INFLATION!


Your future... the future of your business, large or small, depends on how many people understand the story in this booklet!
HOW STALIN HOPES WE WILL DESTROY AMERICA

Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?" But there is a way—if enough of us work at it. We can help more people . . . the men and women who work and vote and pay taxes . . . to understand the nature of inflation, its* ***causes*** *and* ***cures.*** *Then we will have gone a long way toward eliminating this pending catastrophe.*

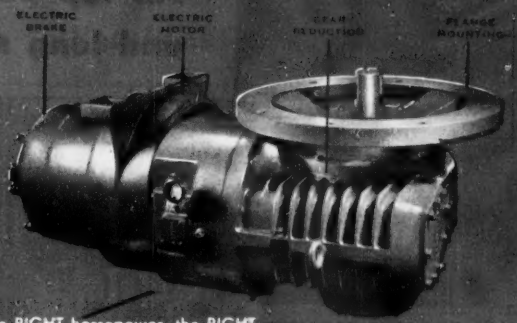
ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it". . . ."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it". . ."In picture form it impresses you more. Most people don't read about it". . ."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

BEMIS BRO. BAG CO.
St. Louis 2, Missouri

FOR EVERY BUSINESS, LARGE OR SMALL: In quantities, it costs only a few cents a copy—$10.00 for 100 copies, down to 3 cents per copy in larger quantities. Single copy free. For full information, write PICTORIAL MEDIA, INC., Attention: Paul Wheeler, 205 E. 42nd ST., NEW YORK 17, N.Y.



You can't beat the combination of the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features all in one compact unit that you can use RIGHT where you want it. It's the best way and the easiest way to select your power drives because you purchase one unit, handle one unit in your receiving, production, or maintenance departments . . . set one unit in place and you're ready to go.

Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you an enormous selection of integrally built power drives from which you can easily select the combination of features that's just right for each job.

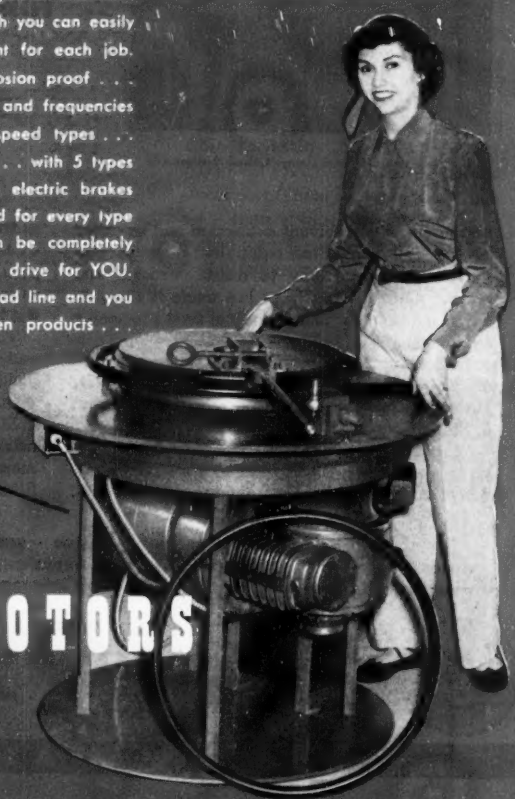
it's so easy to do it

RIGHT

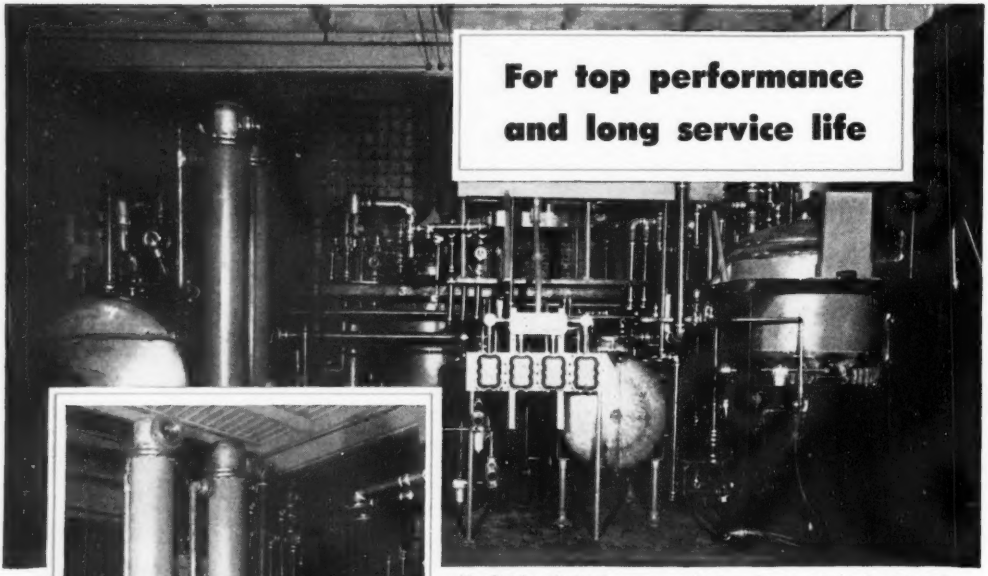
Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

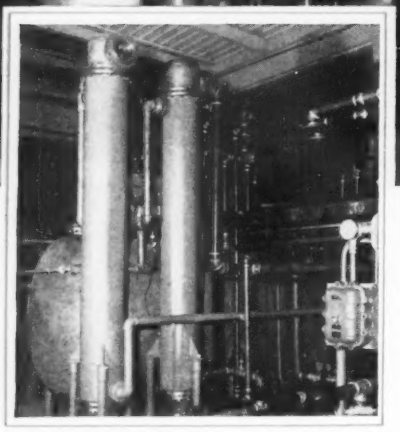
THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO



MASTER GEARMOTORS



The Stainless Steel twin extractor unit shown here was designed and built for William J. Stange Co., Chicago, Ill., by the Pfaudler Co., Rochester, N. Y. The packaged unit includes several percolators, dryers, four tanks with capacities from 300 to 1,500 gallons, condensers, pumps, valves and fittings.



Stainless condensers and storage tank of this specially designed package unit.

this spice extractor unit is built of U·S·S Stainless Steel

HERE AGAIN, in the solvent extraction and recovery of spices, Stainless Steel equipment demonstrates the outstanding ability to resist corrosion and protect natural flavor that has made it the preferred material for many types of food processing equipment.

Discussing the factors that led to the selection of Stainless Steel for this twin extractor unit, Harry R. Ansel, Secretary-treasurer of the William J. Stange Co. says:

"Certain major parts of the extractor units require a material which would be resistant to corrosive attack by certain organic compounds and, at the same time, have strength and adaptability to the design of a pressure vessel. In addition, certain working parts had to be resistant to abrasion. Stainless Steel meets these requirements to the best all round advantage."

Today, with equipment replacements so difficult, U·S·S Stainless Steel's long service life is yielding big returns in many types of processing jobs.

Stainless cuts maintenance requirements . . . is extra protection against costly breakdowns . . . two more reasons why it deserves a big role in your future equipment plans.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-982

UNITED STATES STEEL

"My family loves fresh peaches—
That's the important reason
I'm thankful that with NORDA PEACH
There's *always* a peach season"

Peach flavor takes no holiday all year, thanks to Norda. Norda Peach Flavor is typical of the taste of fresh, ripe peaches.

Use both Concentrated Genuine and Fine Imitation NORDA PEACH FLAVOR to make better products at lower cost. These are true quality flavors—natural in strength and aroma; concentrated, rich, real peach. They will give you much satisfaction.

Test, taste, and try NORDA PEACH FLAVOR in your mixes, fondants, and syrups. Send for your free samples today—new Norda Flavor Catalogue, too.

Norda Peach . . .
Another "Favorite to Flavor It"

Norda ESSENTIAL OIL AND CHEMICAL COMPANY, INC.
601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON • PARIS

OPERATION: FLEXIBILITY

A CLEAVER-BROOKS STEAM BOILER GIVES YOU:

✓ **Quick, effortless response to fluctuating steam demands.**

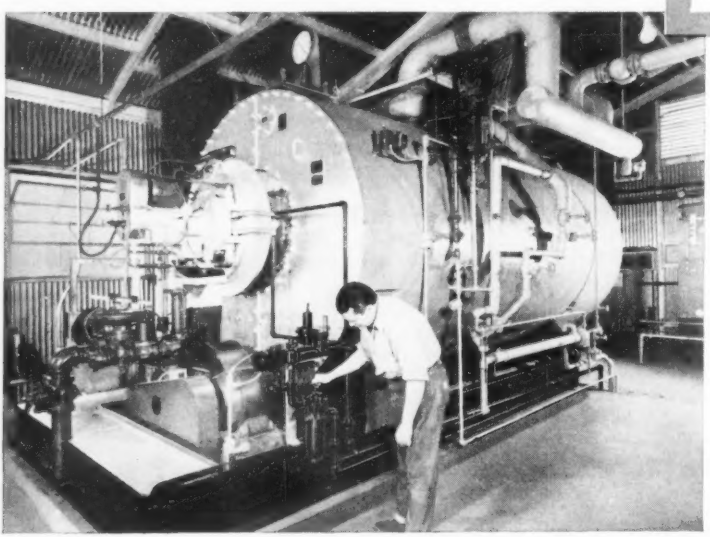
✓ **Equally high efficiency (80%) operating with oil or gas.**

Fluctuating steam loads are no problem when you have a custom-planned Cleaver-Brooks boiler in your plant. Whether your demand is heavy or light, steady or variable, these sturdy heavy-duty boilers respond instantly to your steam needs. Even with loads as low as 30% of rating, Cleaver-Brooks boilers operate with a flat 80% efficiency.

Cleaver-Brooks boilers burn either oil or gas . . . either fuel is properly proportioned to meet your steam demand and need. No banking of fires or loss of valuable heat during low load periods. You benefit with lower fuel bills, less maintenance, reduced operating costs.

If you are considering a change in your present boiler plant—think about flexibility — and get the complete facts about Cleaver-Brooks custom-planned boilers. Cleaver-Brooks self-contained boilers 15 to 500 HP, 15 to 250 lbs., p. s. i. — oil, gas, combination oil and gas firing. CLEAVER-BROOKS COMPANY, 327 East Keefe Avenue, Milwaukee 12, Wisconsin.

Cleaver-Brooks
STEAM BOILERS
the first and finest of their class



Write for a Cleaver-Brooks Steam Boiler Catalog.

It's Natural Flavor that sells Food!

This unique seasoning magnifies natural flavor as nothing else can

ZEST guards processed foods from "FLAVOR FADING"

The fresh, natural flavor of your processed foods is too important to leave to chance. Food processors in ever-increasing numbers are relying on ZEST to guard their foods from that enemy of food sales—"Flavor Fading." They have found—and you will too—that a tiny amount of ZEST, pure Monosodium Glutamate, added to foods "locks in" every bit of natural food flavor. ZEST enhances and magnifies this natural food flavor without adding flavor, aroma or color of its own. You will notice only one change in foods when you add ZEST . . . they will taste so much better than ever before that you'll wonder how you ever got along without ZEST! The addition of wonder-working ZEST requires no change in your present processing procedure . . . simply add a small quantity of it before, during or after processing. You can use low-cost ZEST in soups, fish, stews, vegetables, processed meats, poultry . . . and scores of other foods. It makes no difference whether the foods are canned, frozen, or dehydrated . . . ZEST works its seasoning miracle just the same! *Write today* for the full story of ZEST and its sales-boosting abilities.

ZEST®

Pure Monosodium Glutamate

A. E. STALEY MFG. CO., Decatur, Illinois

—*MAIL THIS COUPON NOW!*—

A. E. Staley Mfg. Co.
Dept. FE-7, Decatur, Illinois

Gentlemen:
I'd like to know more about ZEST . . . the unique food seasoning that makes processed foods taste and sell so much better! Rush me details right away.

*Name*_____

*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

are businessmen

COLD-BLOODED?

OF COURSE NOT! Literally, their normal body temperature is 98.6—same as laborers, engineers or any other group of people. And, figuratively, they're no more, or no less, cold-blooded—as a group.

We all know unreasonable generalizations can be dangerously false. Common sense and on-the-job experience show us the value of dealing specifically with ideas, problems—and *people.*

Let's not make the big—and costly—mistake, then, of generalizing on religious or racial groups. Adopt and *carry out* these common sense principles:

1. Accept—or reject—people on *their individual worth.*
2. Don't listen to or spread rumors against a race or a religion.
3. Speak up, wherever we are, *against* prejudice. Work for understanding.

A PUBLIC SERVICE PROJECT ★ THE ADVERTISING COUNCIL ★

Published in the public interest by:

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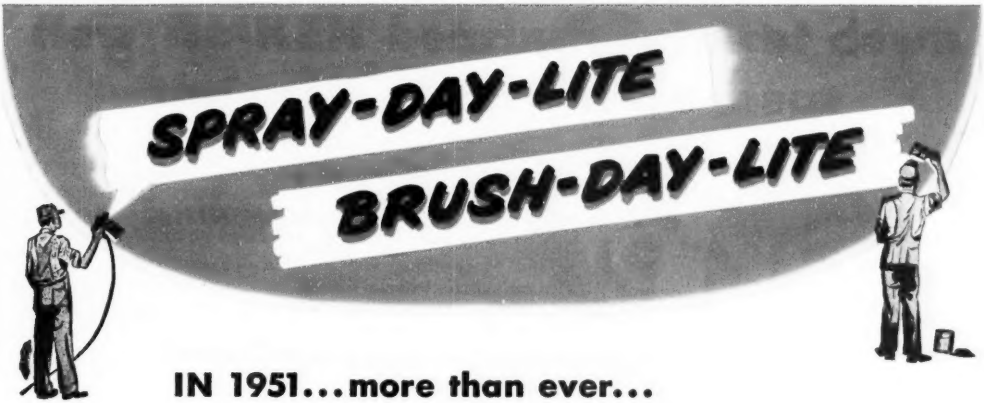


IN 1951...more than ever...

it pays to use America's leading

one-coat

Interior Maintenance Paint!

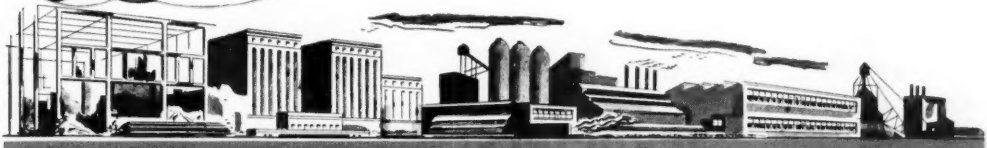
America's First and Finest

COLOR SERVICE

to make your painting pay extra dividends at no extra cost

A service comprising detailed color suggestions tailor-made for you by trained consultants from Glidden Color Laboratories with over 21 years of experience. These comprehensive color harmony plans for interior painting based on Glidden's famous Sight Perfection Program pay important extra dividends! For complete information about this free service, write Dept. B-751.

The rearmament program demands heavy duty wall paints that cover in just one coat and give more years of service. Glidden SPRAY-DAY-LITE and BRUSH-DAY-LITE do both . . . saving you critical time, labor, material and money. Their high light reflection improves vision and eliminates eyestrain . . . reducing spoilage, promoting safety, building better employee relations. In non-fading white and 10 attractive colors.

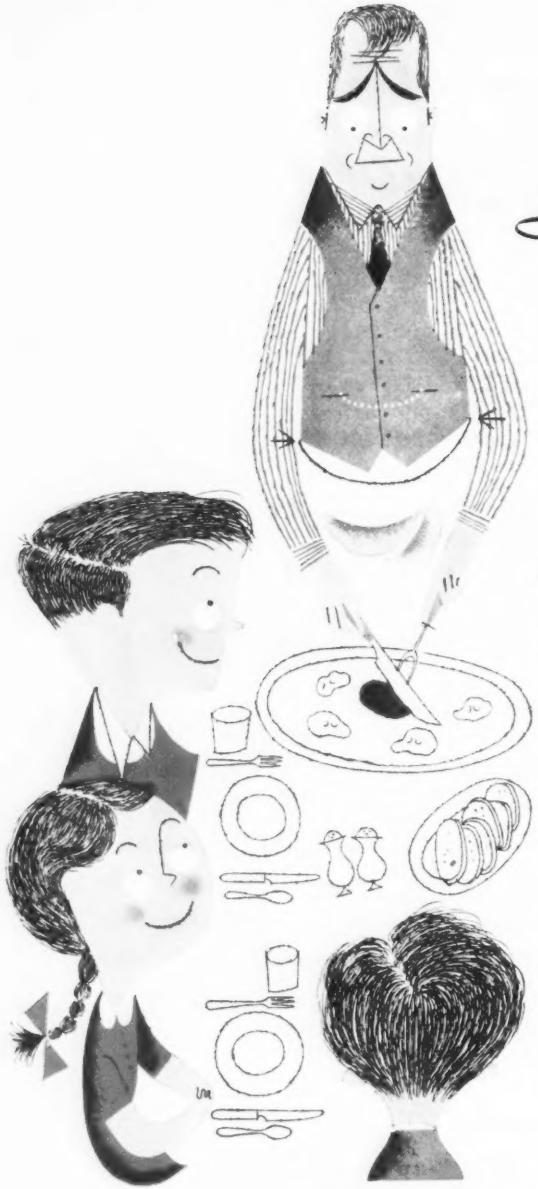


Glidden *Pacemaker in Paints*

MAINTENANCE PAINTS

QUALITY Glidden PRODUCTS

THE Glidden COMPANY - CLEVELAND 2, OHIO
IN CANADA: THE GLIDDEN COMPANY, LTD., TORONTO 9, ONT.



Stainless must go a long way, too!

To meet the demands of national defense and civilian needs, stainless must go a long way. That's why, now, more than ever—if you use stainless—use it wisely and efficiently.

Stainless is a name given to a broad list of grades and finishes—therefore, careful selection of the best available materials for your job is of prime importance. Here Crucible, a pioneer in the development of stainless steels, can help you get the most out of your share of stainless stocks through the unparalleled experience of our metallurgists and stainless fabricating specialists.

And when you can't get the grade of stainless you need, Crucible technical personnel can give you sound advice on the best available materials.

Until the time when stainless is more freely available . . . stretch your supplies of stainless. To do this . . . make use of Crucible's wealth of stainless steel experience.

CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking

STAINLESS STEELS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

How TIMKEN® bearings help cut down the noise of cutting up meat

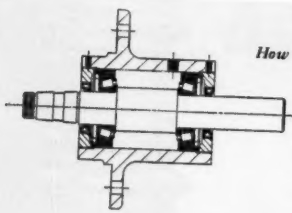
TO assure smooth, quiet operation in their new stainless steel meat saw, Biro mounts the lower pulley shaft on Timken® "cushion-cup" bearings. A special ring of synthetic rubber bonded to the bearing cup absorbs the machine's noise.

Timken bearings also help the saw handle large cuts of meat. The tapered construction of Timken bearings enables them to take radial and thrust loads or any combination. And Timken bearings practically eliminate friction due to incredibly smooth surface finish and true rolling motion.

Original blade precision and cutting accuracy are maintained, because Timken bearings hold shafts in positive alignment. Wear on moving parts is reduced, minimizing maintenance and the risk of breakdowns.

Backed by more than half a century of bearing research and development, Timken bearings are first choice throughout industry. Insist upon them for all the equipment you build or buy. Always look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **THE BIRO MANUFACTURING CO.** mounts the lower saw pulley shaft of its new Stainless Steel Power Meat Cutter on Timken "cushion-cup" bearings for long, trouble-free performance.

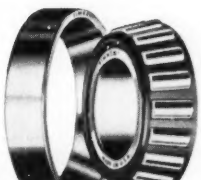
DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

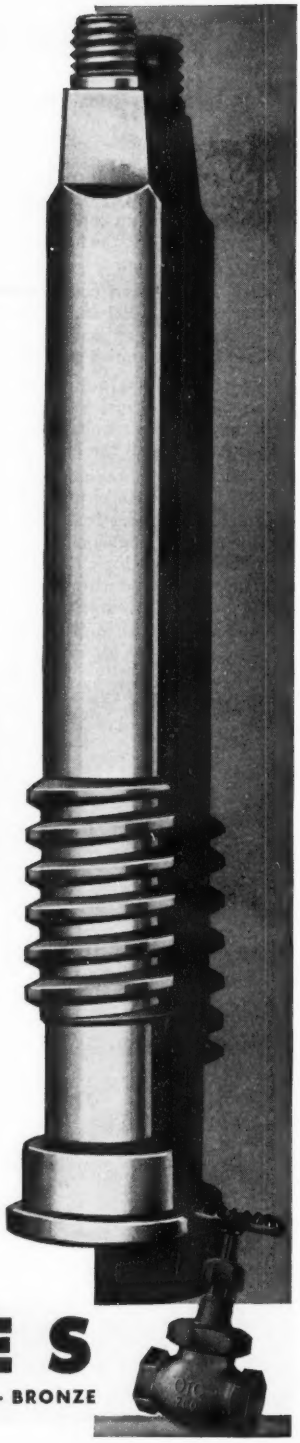
TAPERED ROLLER BEARINGS



NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST ⬭ LOADS OR ANY COMBINATION

THIS STEM WILL LAST LONGER

because it's machined from OIC Alloy 40



Months ago, we introduced Alloy 40 to the field; use has confirmed our laboratory tests. Now, we are ready to tell you about it.

Alloy 40 completely eliminates galling and seizing. It is harder and stronger. It is highly resistant to attack by corrosive liquids and semisolids. It lasts longer!

All OIC Bronze Valves are now equipped with Alloy 40 stems. The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1883

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

the door is still open

and there is still some

VISQUEEN FILM

available for experimental work

We're anxious to provide adequate amounts of this useful material to assist in the development of new market potentials, and we're making every effort to supply sufficient quantities for such evaluation work.

In some cases it may not be possible for us to supply Visqueen to your exact specifications, in spite of our desire to do so. But we're trying.

So if your experiments call for a polyethylene film with many unique properties, write or wire or ask your Visqueen representative for details.

important! VISQUEEN film is all polyethylene, but not all polyethylene film is VISQUEEN. VISQUEEN is the only film produced by the process covered by U.S. Patent No. 2461975. Only VISQUEEN has the benefit of the research and extensive technical experience of The Visking Corporation, pioneers in the development of polyethylene film. Be sure. Always specify VISQUEEN film for superior tear and tensile strength and greater uniformity.

VISQUEEN* **film . . . a product of**

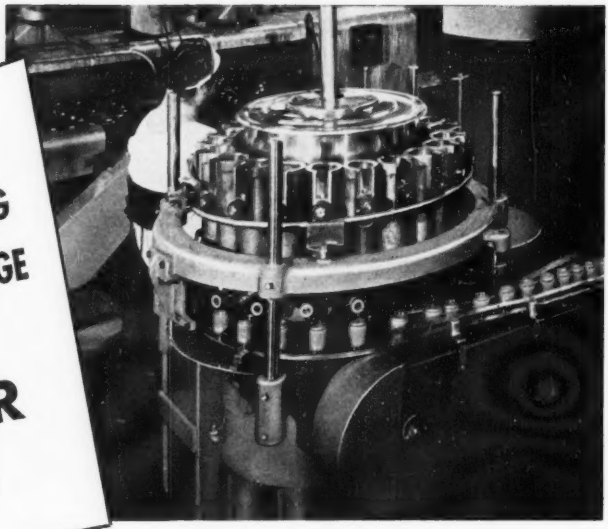
THE VISKING CORPORATION

Preston Division • Terre Haute, Indiana

In Canada: Visking Limited, Lindsay, Ontario

*T. M. The Visking Corporation

YOU CAN PROFIT FROM FASTER FILLING AND REDUCED SPILLAGE with PFAUDLER FILLERS



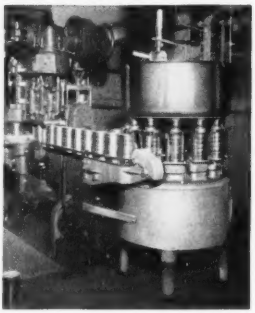
PFAUDLER PISTON FILLERS fill from 100 to 600 containers per minute, depending on the product being handled. Made in four models with container capacities to 5 qt.

Whatever your filling job, the chances are that you can do it at lower cost with a Pfaudler Filler.

With the **Pfaudler Rotary Piston Filler,** for example, the "no-can-no-fill" feature practically eliminates spillage and waste. No topping is required for glass jars because an instantaneous volume adjustment controls the fill within 1/10 of an ounce. And Pfaudler Piston Fillers operate so much *faster* that you'll need fewer units to do the job. This means lower labor, power and maintenance costs . . . mighty important factors in today's highly competitive food market.

FASTER TO CLEAN—EASIER TO KEEP SANITARY! Only a few minutes are needed to disassemble the piston and valves of the Pfaudler Piston Filler. No tools are required. And an added sanitary feature is the elimination of piston rings.

Pfaudler Gravity Flow Fillers are precision-built for extra-long service at high speeds. To meet your most exacting requirements, they are available with different types of valves—(1) open-air tube valves for standard products (2) closed-air tube valves for extreme accuracy (3) non-aereating valves for minimizing oxygen content.



PFAUDLER GRAVITY FLOW FILLERS are made in five sizes to fill all products that flow by gravity in container capacities from 8 oz. to No. 10.

Pfaudler

Get in touch with your nearest Pfaudler representative for complete, detailed information.

THE PFAUDLER CO., ROCHESTER 3, NEW YORK

Engineers and Fabricators of Food Processing Equipment

GLASS-LINED STEEL
Hastelloy—Aluminum
Tantalum—Carbon Steel
Solid or Clad Stainless Steel
Nickel, Inconel, Monel

CORROSION CRIPPLES-MORE WAYS THAN ONE

Valuable products as well as vital equipment are threatened

Corrosion takes its toll in more ways than one—it eats away costly, hard-to-get equipment—wastes man-hours while plants are shut down for repairs—and causes loss of vitally-needed products through contamination.

Every industry suffers from corrosion in some form, yet much of this waste can be avoided by taking these steps:

1. Check manufacturing equipment, storage tanks, and other items exposed to corrosive fumes, acids, alkalies, or moisture.
2. Arrange to protect them with AMERCOAT — the corrosion resistant coatings, each built to conquer specific industrial corrosion problems.

Manufacturers in nearly every industry have found that it pays to protect — protect with AMERCOAT.

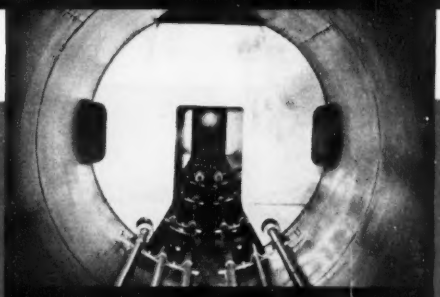
AMERCOAT CORPORATION

A division of
American Pipe and Construction Co.

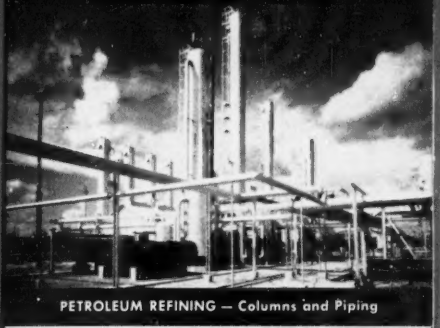
4809 FIRESTONE BLVD., SOUTH GATE, CALIFORNIA

FOLLOW THE LINE OF most RESISTANCE

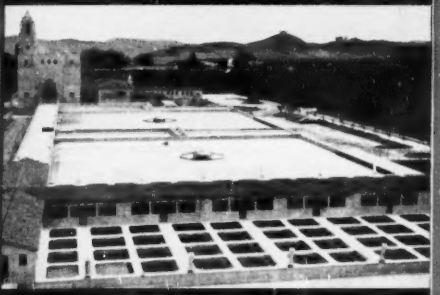
2-51-I



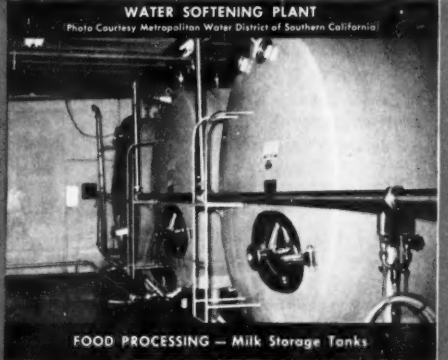
CHEMICAL PLANTS — Caustic Soda Tank



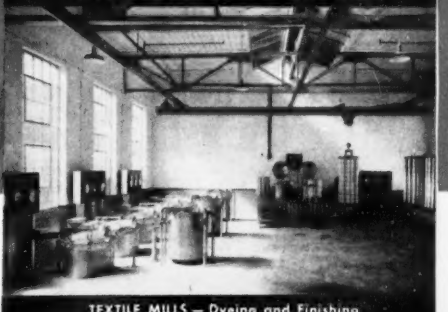
PETROLEUM REFINING — Columns and Piping



WATER SOFTENING PLANT
Photo Courtesy Metropolitan Water District of Southern California



FOOD PROCESSING — Milk Storage Tanks



TEXTILE MILLS — Dyeing and Finishing

This Steel-Service Team for Food Industry Requirements

Convenient to food industry operations from coast to coast, thirteen Ryerson steel-service plants stand ready to supply the food industry and its equipment builders.

True, shortages resulting from the twin pressures of defense requirements and unprecedented civilian demand may make it impossible for us to furnish every item on every order, much as we would like to. But it *is* likely that most of your requirements are among the stainless carbon and alloy steels we have on hand for prompt shipment. And experienced Ryerson steel men are always glad to work with you —help you make the most of available steel.

From switchboard to shipping floor all of us are ready to give you prompt service whenever humanly possible. So call us for every steel need.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished.
STRUCTURALS — Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate.
SHEETS—Hot and cold rolled, many types and coatings.
TUBING—Seamless and welded, mechanical and boiler tubes.
ALLOYS—Hot rolled, cold finished, heat treated.
STAINLESS — Allegheny bars, plates, sheets, tubes, etc.
REINFORCING—Bars and accessories, spirals, wire mesh.
BABBITT — Glyco bearing metal, also Ryertex plastic bearings.
MACHINERY & TOOLS—For metal fabrication.

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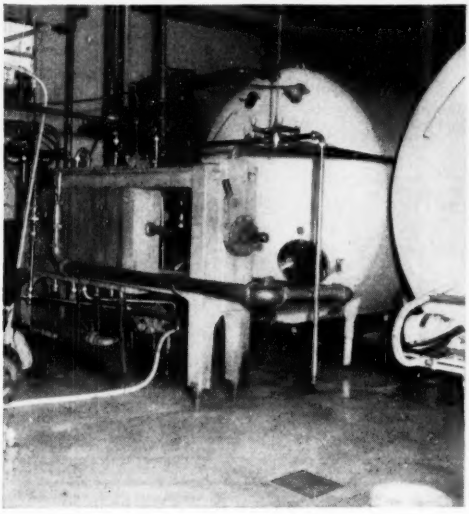
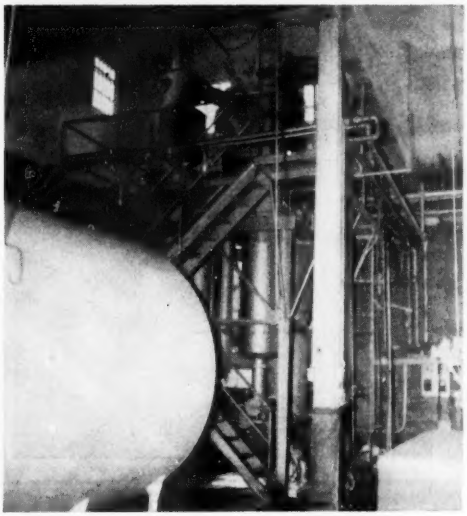
JOSEPH T. RYERSON & SON, INC. PLANTS AT NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO





USED BY GOULD. Left: Plate pasteurizer and fresh milk storage tanks. Right: Double-effect falling-film evaporator.

It's Here
Frozen Concentrated Milk

Citrus industry evaporating technics set the stage for Gould Milk's unusual 4-to-1 frozen concentrate—claimed outstanding on many counts

FE STAFF

When frozen concentrated orange juice first appeared commercially, a fast growing dynamic new food industry was born almost overnight. And now, activities in dairy circles seem strikingly familiar by comparison. For the dairy people, too, now have an exciting new product—concentrated milk—which may make food history repeat itself.

But the citrus revolution has done more than just set a pattern for milk processors to follow. For one of the pioneer processes for concentrating milk has been developed from Florida citrus know-how. This is the Milk Concentrates Corp's. patented system for making a 4-to-1 dairy product —similar to its handling of the highly successful quadruple-strength citrus item.

First commercial facilities for this product are now being operated by the Gould Milk & Cream Co., Minneapolis. After a half-year of constantly improving processing and test usage, mainly with the military, Gould reports that—

- **Reconstituted 4-to-1 was picked over fresh milk for flavor by taste panels.**
- **Flavor stability did not vary after several months in the frozen state.**
- **Unfrozen product maintained quality over four weeks under refrigeration.**
- **Protein and fat showed excellent stability after extended storage tests.**

Further, Gould believes that its 4-to-1 concentrate—3-to-1 is usual for the other dairy companies—has inherent advantages that are bound to appeal to both merchandiser and consumer. Some of these are—

1. A single-volume reconstitution makes an ideal coffee cream.
2. A double-volume reconstitution makes a desirable cereal milk.
3. The unreconstituted product appears excellent for baking, and
4. The super-concentrated nature saves shipping costs—one carload will provide the equivalent of 32,000 quarts of drinking milk.

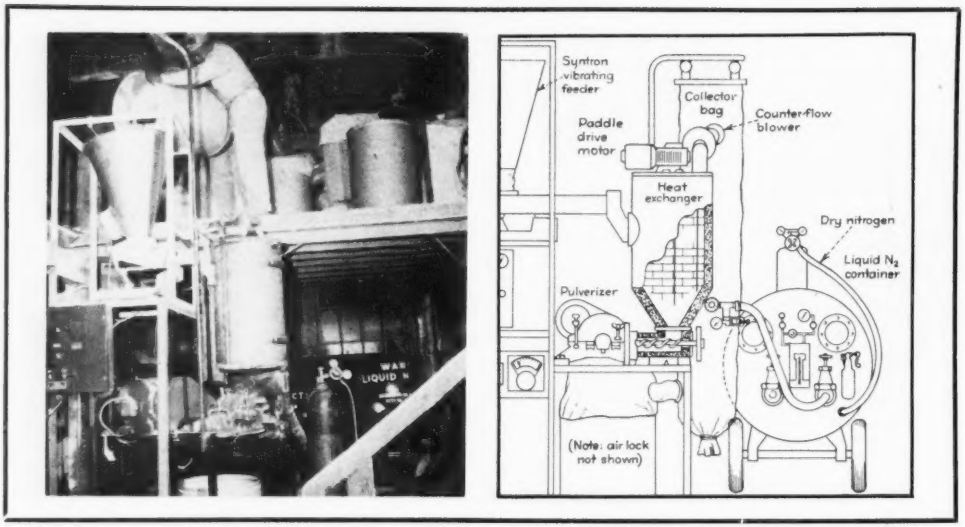
How Process Was Developed

Why couldn't a 4-to-1 milk concentrate be made and popularized along the lines of the citrus product?

This was the question asked of Dr. Arthur L. Stahl, Director of Tropical Food Research at the University of Miami. It came from Russell N.

(*Turn to page* 121)

Overall View



WORKER is seen feeding coarse material into hopper. Chilled in heat exchanger, it is then ground in mill.

New Nitrogen Technic Assures

Fine Grinding—In Only One Pass

Applicable to many foods, it's already boosted Eastern plant's output of quality agar-agar . . . Trick is in "brittle chilling" that enables speedy, no-clump pulverizing

GERARD MILLER
President, Importers' Service Corp.,
Jersey City, N. J.

Through use of a unique process employing liquid nitrogen, Importers' Service Corp., Jersey City, N. J., now successfully grinds agar-agar on a continuous basis—and in a single pass.

What's more, the grinding is finer than was heretofore possible, thus providing a superior product. Before development of the new technic, agar-agar could only be ground successfully under relatively difficult conditions with high loss.

Initial successes with the process have been realized in the production-grinding of heat sensitive and hard-to-grind materials. Items other than agar-agar are continuously being added. Among them are nutmeg (which can now be ground at good rates to a fineness of better than 80 mesh and with no appreciable moisture loss), and also vitamin enriched hydrogenated lard (which can be processed, at about 500 lb. per hr., to any desired fineness without impairment of vitamin poteney).

Other foodstuffs seen benefiting are: Coffee, coconut, mace, cloves, gelatin, dill and caraway—due to the prevention of loss of natural aromas, oil essences, or moisture in such processing.

Being inert, the nitrogen cannot change the flavor or taste of the product. Moreover, presence of this inert element prevents development of rancidity in products during grinding.

Crux of Process

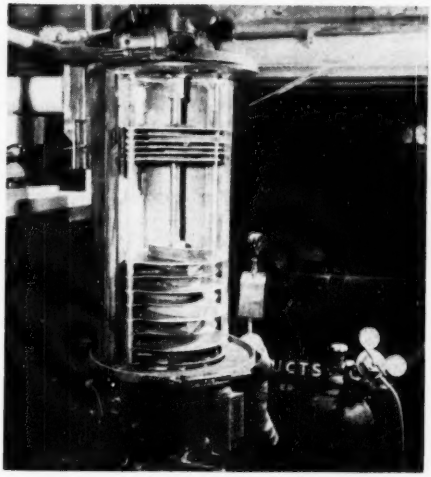
Credit for the achievement goes to Linde Air Products Co. Crux of the process that it devised is the means whereby liquid nitrogen rapidly cools the material to be ground to a point of maximum fragility, thereby reducing the amount of energy required for fracture. This liquid can take the temperature down to —320 deg. F. if necessary.

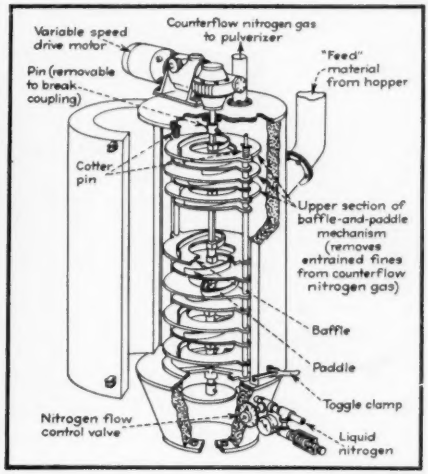
Blending has always been a problem for food processors because of difficulties in obtaining top-quality spices in finely divided form. To grind nutmeg to a fine powder had, up to now, required several passes through the grinder for satisfactory results. And it could not be pulverized continuously because "clumping", or caking, tended to foul the pulverizing equipment and cause shut-downs.

Attempts at speeding the pulverization, using existing equipment and methods, produced a material which had lost the desired aroma and texture.

Importers' Service Corp., a custom grinder of foodstuffs, spices, and drugs brought in through the Port of New York, came into the picture when it was faced with increasing demands for ground foodstuffs. But to handle the new volume with existing grinding processes and using conventional coolants would have required an extremely uneconomical expansion of plant facilities.

Heart of System ▼





KEY unit is heat exchanger (opened here to reveal component parts). Baffles control flow rate of material.

Then came the answer—the liquid nitrogen process which prevented the heating and moisture losses that hobbled the old method.

Now, with the use of pulverizers and liquid nitrogen, various products can be ground continuously without heating and very little moisture loss.

How It Works

In the new operation, a worker feeds coarse material into a vibrating Syntron hopper (upper left photo), from which it travels to the top of the stainless steel liquid-nitrogen heat exchanger (vertical drum-like unit below worker). From the bottom of the heat exchanger, the refrigerated coarse material drops into a worm feed leading to a high-speed pulverizing hammer mill.

This mill, rotating at 10,000 rpm., grinds the chilled material readily and drops it into the drum below. A cylinder of dry nitrogen (seen in photos) is used to supply the necessary pressure to force the liquid nitrogen from the mobile carrier to the heat exchanger.

Entered as Fine

To reduce heat seepage, the heat exchanger is enclosed with a double-wall shell insulated with Fiberglas. Liquid nitrogen from the portable insulated storage container is forced under low pressure into the bottom of the heat exchanger as a fine spray. Thus, the material is cooled by direct-contact heat transfer and evaporation.

Material entering the top of the exchanger is also precooled by the cold, gaseous nitrogen that is evolved below. Passage of the coarse material through the heat exchanger is aided by motor-driven rotating paddles that force material from one baffle down to the next.

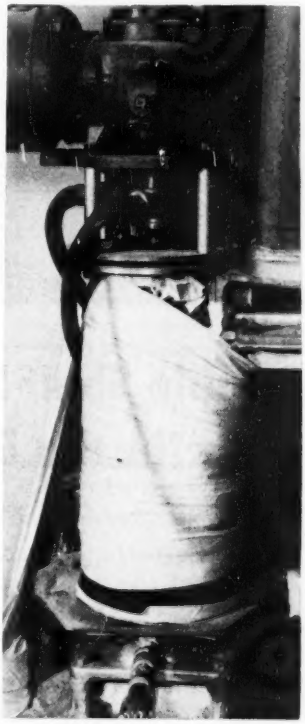
The upper baffles act as fines collectors. Unusual process control is possible, not only by regulating the feed rate to the exchanger but also by controlling the rate of liquid nitrogen inflow and the speed of the rotating paddles within the exchanger.

Sanitation Stressed

Completion of a special "grinding area" in the Importers' Service plant will accommodate this equipment. Layout of this area has been especially designed to accommodate custom as well as test grinding. And the fact that the equipment used for liquid nitrogen pulverization can be completely disassembled for thorough cleaning will enable the company to make quick "clean" changes from one product to another.

Added cost entailed by the new system is 2 to 15c. per lb. But the additional cost can in many cases be more than justified by the higher speed, the ready attainment of the required fineness, and the effective protection of desired product characteristics.

Actual cost in individual cases will depend on the range between size of feed material and final particle size desired.



IN ACTION. Closeup of special liquid nitrogen exchanger during a grinding operation. Note that unit is wrapped to minimize heat seepage, loss of gas.

ONE OF the keep-'em-fresh packets may be seen here within bag (arrow), and another is shown (at left) in order to reveal explanatory note printed on its face.

Double Shelf Life? —It's "In the Bag"

Potato chips stay fresh and crisp twice as long when special perforated packet of absorbing and drying agents is slipped into the sack

ROBERT N. MILLER and WILLIAM E. ROBERTSON
Georgia Institute of Technology, and Gordon Foods, Inc., respectively, Atlanta, Ga.

Ten days to two weeks' longer freshness and crispness of potato chips can be obtained by inserting special, small packets of activated carbon and silica gel in the bags.

This has been successfully demonstrated by exhaustive tests in Florida markets. Here is the story:

As all processors know, the problem of food storage in hot weather can be very serious because of the harmful effects of advanced temperatures and high humidity.

In the case of potato chips, many thousands of dollars are lost each summer through deterioration on store shelves. And what's more, no estimate can be made of the loss of customers and goodwill resulting from the purchase of stale potato chips.

Faced with this problem, which is particularly critical in the Florida market, Patrick F. O'Brien, president of Gordon Foods, Inc., Atlanta, Ga., decided, in May 1949, to sponsor a research project at the Georgia Tech Engineering Experiment Station. Object was to develop methods of increasing shelf life of potato chips in hot weather.

Project Detailed

During the first few months of the project, a comprehensive literature survey revealed that many antioxidants have been used to retard the development of rancidity in oils (see list at end of article).

The experimental work was started by testing the most promising of these antioxidants, first for their preservative effect on cottonseed oil, and then for the effect on aging properties of potato chips fried in the treated oil.

An incubator was prepared to enable the aging test to be conducted under controlled conditions of temperature, humidity, and illumination. Light control was important, since the development of rancidity is accelerated by light as well as by heat and moisture.

A large constant-temperature oven (10 cu. ft.) was modified to meet the testing requirements. A 20w. fluorescent tube provided illumination, and a saturated atmosphere was maintained by means of large pans of water placed on the floor of the oven. The temperature was held constant at 95 deg. F. during the entire test period.

Selection of a test that would give a fairly accurate measure of rancidity was a major problem. The literature survey disclosed the fact that no single chemical test is infallible. White,[1] who made an evaluation of rancidity tests, considers the Wheeler Iodometric Peroxide Method[2] to be one of the

[1] *Can. J. Research*, 19, D, 278, 1941.
[2] *Oil & Soap*, 9, 89, 1932.

best means for rancidity estimation. Taste and odor tests depend considerably upon the judgment of the analyst, but they are very important because a consumer checks the freshness of a food product by these means.

Finally adopted for the project was the Wheeler Iodometric Method, used in conjunction with organoleptic tests for taste, odor, and crispness.

How Peroxide Test Works

A 5g. portion of the oil to be tested is weighed into a 200-300 ml. Erlenmeyer flask and dissolved in 30 ml. of a mixture of 60 percent acetic acid and 40 percent chloroform. To this mixture is added 0.5 ml. of a saturated KI solution. The flask is then shaken until the solution becomes clear. After 2 min., 30 ml. of water is added and the mixture is titrated with a sodium thiosulfate solution (0.01N or 0.1N), using starch as an indicator. The flask is shaken vigorously near the end of the titration so as to liberate all the iodine from the chloroform layer. Potato chips themselves can be similarly tested.

The number of milli-equivalents of perioxide present per 100g. of sample is calculated from the amount of sodium thiosulfate required to titrate the iodine liberated.

$$\text{Milli-equivalents/1,000g.} = \frac{\text{cc. x N}}{\text{g. sample}}$$

Odor, Taste, and Crispness Tests

The odor test is made by inhaling the package atmosphere immediately after the potato chip bag is opened. The odor is then given a rating according to the following scale:

Excellent	100
Good	90
Fair	80
Barely acceptable	70
Old	60
Slightly rancid	50
Rancid or repellent	0 to 50

The taste test is made by tasting a selected chip. The test chip should be of the color shade representative of the rest of the chips in the package, because a dark chip will not taste as good as a light colored one. Taste and crispness are then given a numerical rating according to the same scale used for odor. In judging taste, both the initial taste and the taste after the chip has been chewed for a few moments must be taken into consideration, since a slightly rancid chip will frequently have a good taste when it is first placed in the mouth.

Accuracy of the odor and taste test is increased by allowing 5 min. intervals between tests on different samples. Results are reproducible and, after a little practice, two men rating the same potato chips will agree within 10 points on the numerical scale.

In making the tests, potato-chip samples were prepared and packaged under varying conditions and then placed in the incubator. At weekly intervals one sample from each set was removed and checked for peroxide number, odor, taste, and crispness.

In checking the aging characteristics of chips fried in cottonseed oil containing various antioxidants, it was found that frequently the crispness and good flavor could be maintained but an objectionable odor would develop. This odor was more pronounced when sealed cellophane bags were used than when the chips were packaged in stapled wax paper bags. Presumably, this was because the offensive odors were able to escape from the unsealed bags.

Activated Carbon Stops Odor

To absorb this odor, a small amount of activated carbon was placed in one of the cellophane test bags before sealing. After one week of accelerated aging in the incubator, it was found that the sample with the activated carbon was far superior in odor and taste to samples which did not contain it.

And the activated carbon seemed to have a beneficial effect beyond its deodorizing action. This was checked by aging a series of samples that had been fried in plain cottonseed oil containing no antioxidant. It was found that the activated carbon by itself was just as effective in preserving the freshness and flavor as were any of the antioxidants.

Potato chips sealed in cellophane bags with activated carbon maintained good flavor and crispness for long periods of time, even though stored at 95 deg. F. in a moisture saturated atmosphere. Those placed in stapled wax paper bags, however, lost their crispness after three or four days of storage.

Silica Gel Kept Them Crisp

In an effort to protect the chips from the moisture which entered the unsealed wax paper bags, a small quantity of silica gel was added. Subsequent experiments revealed that a mixture of activated carbon and silica gel would effectively maintain good flavor, odor, and crispness of potato chips packaged in unsealed wax paper bags for periods of a week or more under the severe test conditions of the incubator. This would be equivalent to at least two weeks of normal hot weather storage.

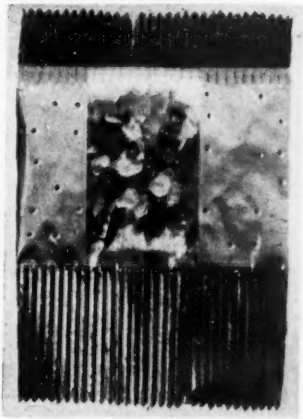
Test results (shown in accompanying table) conclusively demonstrate the effectiveness of the activated carbon-silica gel combination despite severe storage conditions.

After ten days in the incubator, potato chips sealed in cellophane bags with activated carbon and silica gel were in excellent condition and those packed with the agents in unsealed wax paper bags were acceptable, while both the cellophane and wax bag control samples (no agents) were repellent and inedible.

The next problem was to find a practical method of incorporating the silica gel and carbon in the package with-

(*Turn to page* 147)

Packet Close-Up



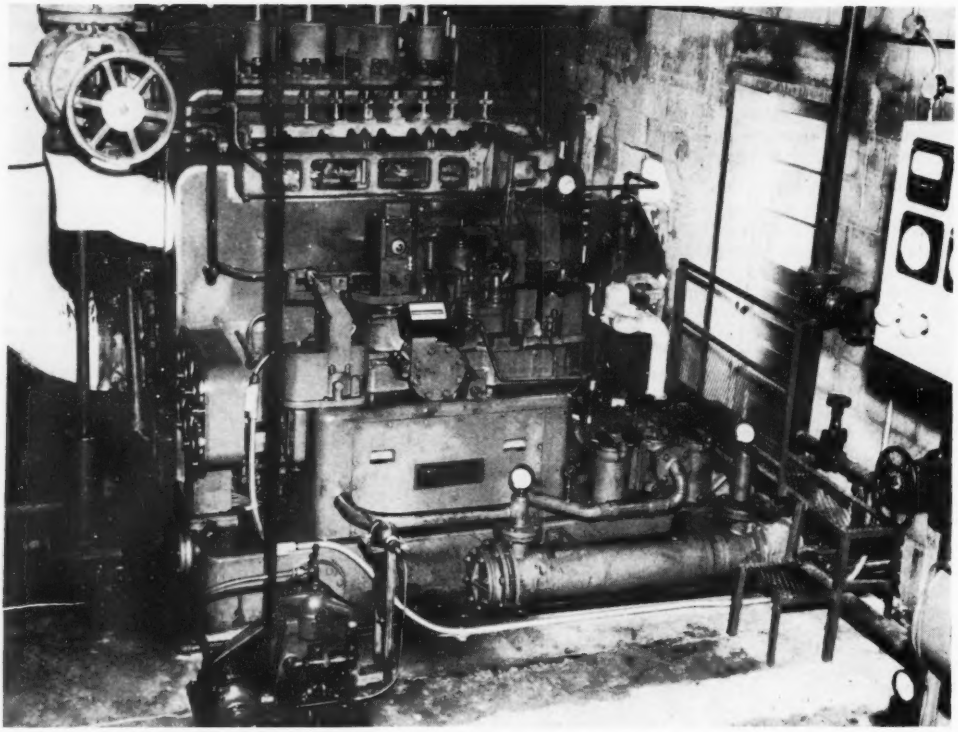
MIXTURE OF CARBON AND GEL is seen through back of packet. Note perforations that permit action of agents.

Results—With and Without

TABLE—AGING TESTS Show How Activated Carbon-Silica Gel Protects Potato Chips. These Are the Results After 10 Days in Incubator at 96 Deg. F. in Moisture-Saturated Atmosphere and Under Light from a 20W. Fluorescent Tube.

Samp	Peroxide Number	Smell Rating	Taste Rating	Crispness Rating
Test Series (with agents)				
Double wax paper bag	5.21	90	85	70
Sealed double cellophane bag	5.10	80	100	100
Control Series (without agents)				
Double wax paper bag	6.16	60	60	40
Sealed double cellophane bag	8.54	30	65	60

This turbine reaps extra dividends by delivering . . .



STEAM direct from the boiler at 250 psi. is first passed through this Worthington turbine, where part of it is converted into work energy. Exhausted at 40 and 4 psi., this steam is then used to satisfy processing requirements.

Full Use of Your Steam

—Can save you thousands of dollars a month

Trick is to harvest low-cost electrical power by using a non-condensing turbine—as demonstrated here by citrus concentrate producer

BEN L. SKINNER

Research Director, Juice Industries Division, Clinton Foods, Inc., Dunedin, Fla.

Complete utilization of steam is the practice—and it pays handsomely—at our Juice Industries Division plant of Clinton Foods Inc., Dunedin, Fla.

Since steam is required for our processing, we take advantage of the economies possible in the generation of by-product power. Operating in this manner we are able to run our electrical equipment driving refrigeration compressors and other machines at a fuel cost as little as 17/100c. per kwh.

In contrast, purchased electrical power averages about 1¢ per kwh. Thus, with a plant electrical load of 1,250 kwh., the monthly saving is substantial.

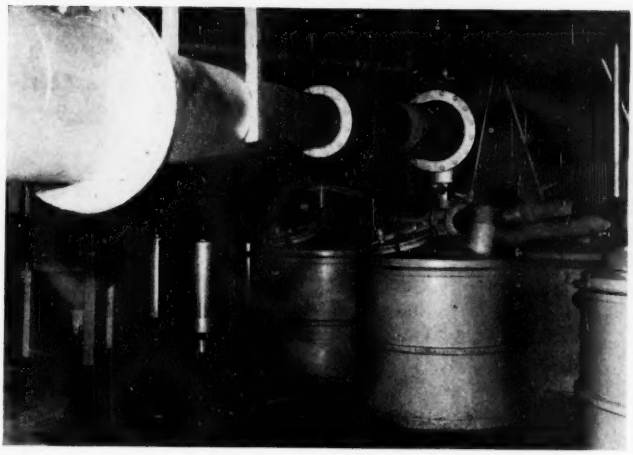
Steam generated in the boilers at 250 lb. pressure, passes through a non-condensing steam turbine, with automatic extraction at 40 lb. pressure. Back pressure at the final discharge is approximately 4 lb. Only enough steam for the processing in the plant is put through the turbine.

Thus, steam is not supplied to the turbine on the basis of the plant electrical load but rather to meet the processing-steam demand. This steam is sufficient to produce practically all the electricity that is required by the plant.

Almost all of the steam is reduced from 250 lb. pressure, on entering, to 4 lb. pressure at discharge. It has been calculated that only about 7 percent of the energy in the steam is used to generate the power in this turbine.

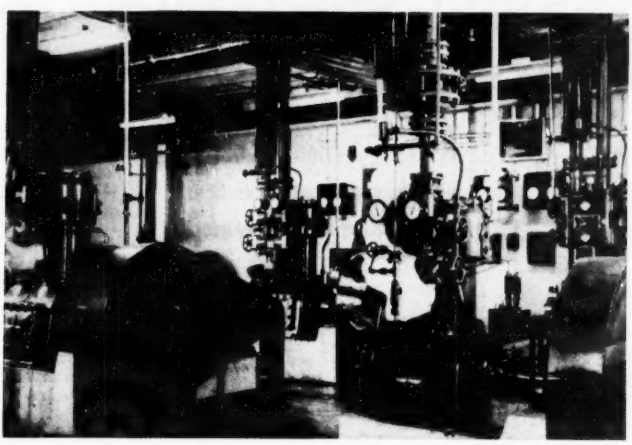
Hence, while ostensibly 60,000 lb. of steam per hour is required to generate

. . . steam to these processing units . . .



VACUUM in these evaporators is achieved by huge low-pressure jets that are operated by steam supplied from the turbine exhaust.

. . . and power for these compressors



REFRIGERATION compressors are employed to freeze juice concentrate. They are driven by large motors having total rating of almost 550 hp.

1,250 kwh., or 48 lb. per kwh., only 7 percent of this steam is converted into work energy. The remainder contains the heat necessary for the processing work—such as operation of the evaporators, heating the plant and running the dryers.

And so, for power generation only about 3.3 lb. of steam is required per kwh. Assuming a fuel cost of 50¢ per 1,000 lb. for generating the steam, the average cost of power, as aforementioned, is 17/100c. per kwh., as against the purchased-power average of about 1c. per kwh. This difference in cost represents a saving to the plant of about $10 per hour, or $6,000 per month, operating, as is customary, at full capacity.

Actually, however, we do not make this full net saving, because slightly more steam is required to operate the jet boosters at low-pressure steam than high-pressure. Operating at low pressure, the probable net saving is in the neighborhood of $5,000 per month.

Process Uses Described

Steam from the turbine, at the extraction point of about 40 lb., is used to operate steam dryers. These units convert the peel of the fruit we process into a suitable cattle feed by drying out the moisture remaining after pressing.

The low-pressure steam, leaving the turbine at about 4 lb. pressure, is employed to operate the molasses evaporator for making citrus molasses from the press liquor obtained in the manufacture of the cattle feed. A portion of the 40-lb. steam is used for operating steam jet boosters, and some of the 4-lb. steam goes for this same purpose.

These boosters are used on the evaporators that manufacture frozen concentrated orange juice. Through their employment, a vacuum of 29.6 in. of mercury is obtained. At this low pressure—approximately 0.4 Hg absolute, or about 0.2 lb. absolute pressure—water will boil at about 55 deg. F. This is the temperature at which the orange juice is evaporated. Juice does not exceed this temperature, except for the slight rise due to the increase in boiling point caused by concentration of the sugars therein. The probable boiling point is from 60 to 65 deg. F.

The outsides of the tubes are heated by the discharge steam from the jet boosters. This steam, at a temperature of approximately 90 deg. F., does not actually touch the juice. Heated by contact with the inside of the tube, the juice vaporizes as soon as the temperature rises above the boiling point. Thus, the juice film in contact with the tubes never actually exceeds the temperature of 65 deg. F., even though the outsides of the tubes are at 90 deg. F.

Steam from the low-pressure, 4-lb. systems is also used for heating the plant in cold weather.

Power Company Tie-In

The steam turbine is normally operated in parallel with the power supplied by the power company. In the event of a power failure, the turbine is automatically thrown back on governor control. Under these conditions it runs on its own governor, maintaining constant speed. And any additional steam drawn by the turbine to maintain the full load of the plant is exhausted, after use, to the atmosphere. This is done by means of an automatic relief valve that vents only enough steam to maintain a constant pressure of 4 lb. gage on the exhaust line.

The turbine does more than afford economy in the operations of the plant—it also offers a standby source of power, highly essential when handling a product that depends on rapid concentration and freezing for preservation.

INTO THESE four Negus cells goes harbor water from pipe (A). Chlorinated water is then piped (B) to rotary fish scaler and filleting table.

RECTIFIER, hooked to the Negus cells, converts a.c. to d.c. current.

Cell-and-Seawater Chlorination

Cuts In-Plant Sanitation Costs

Simple electrolytic unit is employed by Gloucester fish plant to generate chlorine in harbor water. Latter is then used to wash all incoming fish, floors, walls, and equipment

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

By generating chlorine in brine electrolytically, a Down-East processor—Mariner Fish Co., Gloucester, Mass.—has now stolen a leaf from the chemical industry.

Employed are four specially designed electrolytic cells that produce chlorine in harbor water. This water is thus made suitable for efficient and economical in-plant chlorination*.

Chlorine generated by the process is kept in solution, and the germicidal water is then used to wash incoming fish, floors, walls, and equipment, as well as to flume the gurry (inedible skeletal portion remaining after filleting) from the cutting tables.

*By way of comparison, the chemical industry feeds high purity brine to diaphragm or mercury-type electrolytic cells, which generate chlorine and caustic soda. Both are recovered and later employed in the manufacture of a host of chemicals.

Prime benefits derived from use of the water carrying the bactericidal agent are:

- **Reduction in bacteria counts on the fish, and subsequent improvement in keeping quality of the fillets.**
- **Decrease in objectionable "fishy" odors about the plant.**
- **Elimination of slime from the various working surfaces.**

Employed is the Negus cell developed by the Water Processing & Chemical Co., Halifax, Nova Scotia, for in-plant chlorination in Canadian fish-processing plants. Installation is being handled in this country by Standard Laboratories of Boston.

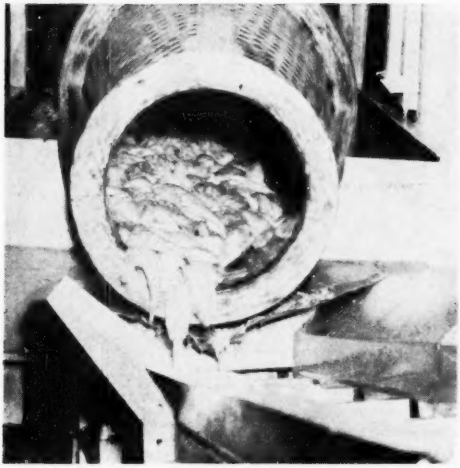
The unit consists of an inverted U-shaped graphite cell—the anode—which is fitted within a metal casing. Inside the cell, a pipe feeds sea water, and the salt is then decomposed into dilute chlorine and caustic soda. Both pipe and casing serve as the cathode. Hooked to the cell is a rectifier that converts a.c. to d.c. current.

Three factors influence the quantity of chlorine generated from brine or sea water. Amount of current, concentration of salt, and the flow of the brine through the cell. By keeping two of these factors constant, the other can be altered to vary the concentration of chlorine in the brine.

Salt in the sea water is a cheap source for obtaining chlorine for sterilizing purposes. And there is another consideration: Chlorine gas is now in tight supply. It is going directly and indirectly into the manufacture of chemicals for defense and civilian use.

How Mariner Generates It

Here is how the chlorine-generating system works at the Mariner plant: About 400 gpm. of sea water is pumped into a 4-in. feed pipe, from which 50 gpm. of harbor water bypasses a booster pump and goes to the four chlorine-generating cells. In the cells, salt in the sea water is broken



FISH traveling through rotary scaler are washed with the chlorinated water coming from 2-in. perforated pipe.

FLUME (A) containing chlorinated water carries gurry from cutting table (above). Hose is used for washing.

down into 120 ppm. of free chlorine and caustic soda. Chlorinated water is then returned to the main line, where the chlorine content is diluted to 15 ppm. From this point, the treated water is ready to do its sterilizing job.

Each cell requires 9¾v. and 75 amp. to operate. Therefore, the entire unit uses approximately 3,000w., and the power cost at 2c per kwhr. is 6c. per hr.

A remote control is provided on a panel board in the cutting department. By pressing pushbuttons, an operator (he need not be skilled) starts or stops the rectifier, which furnishes d.c. current to the four-electrolytic cells.

The first germicidal treatment is at the rotary fish scaler, to which a 2½-in. pipe delivers 50 gpm. of chlorinated water. Here chlorination of the fish is carried on at two points—on the flume carrying them to the scaler and in the rotary unit itself.

As incoming fish are flumed to the scaler, they are washed in chlorinated water. Inside the scaler, the flume also provides an all-around wash of the chlorinated water as the fish tumble through the unit. Effluent from the scaler carries a 5-ppm. chlorine residual.

Sealed fish are flight-conveyed to the cutting table and then filleted. The remaining chlorinated water in the 4-in. pipe is discharged into two stainless steel flumes—one on each side of the 24-station cutting table. The flumes hydro-convey gurry from the cutting table to a screen separator. Gurry is then taken by bucket-elevator to an 8,000-lb. capacity, water-tight metal storage tank outside the plant. Later, the gurry is hauled away and processed into fish meal. The waste water goes back into the harbor.

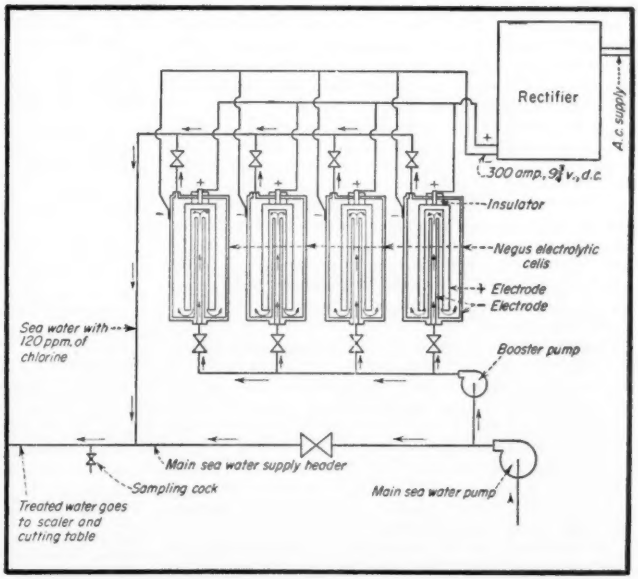
Reason for fluming gurry in the chlorinated water is to keep down fishy odors at the cutting table, on the elevator carrying the waste out of the plant, and in the gurry-storage tank.

In the filleting department there are two outlet pipes on the main line which carry the chlorinated water below the cutting table and to the flumes. Attached to these outlets are 1-in. rubber hoses that are used by the clean-up crew to wash walls, floors, cutting table, and equipment. When these outlets are employed, flow of the chlorinated water to scaler and flumes is turned off in order to build up the water pressure to 42 psi. and to reduce the flow to only 200 gpm. This wash water has a 50-ppm. chlorine residual.

Once a month, current going to the electrolytic cells is reversed for a period of 30 min. to remove calcium,

(*Turn to page* 124)

"How" of Mariner's Chlorinating System



10 SECONDS is all the time it takes to put a cup of cold water and a package of dry mix into mixer.

2 MINUTES in the mixer, and the dessert is poured into molds. No heating required.

NEW, QUICK, COLD-WATER

Made with low-methoxyl pectin, it has advantages over other desserts. It is prepared in 2 min. without heating, and is smooth, light, creamy

A. D. SHEPHERD, R. M. McCREADY and HARRY S. OWENS

Western Regional Research Laboratory (Bureau of Agricultural & Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture) Albany, Calif.

Dessert mixes utilizing low-methoxyl pectin offer advantages over other types of packaged dessert. Only cold water need be added. The gel structure is uniform and smooth. It shows sharp cleavage. And the dessert can be prepared in 2 min. without heat.

The principal problem in preparing low-methoxyl pectin desserts has been the introduction of the pectin substance and calcium salt into a liquid medium and subsequent formation of a uniform gel structure. Enzymes,[1, 2] lactones[3] and heat[4, 5, 6, 7, 8, 9] have been used in attempts to solve the problem. But all these resulted in disadvantages in time or difficulties in preparation.

R. M. McCready and others in this laboratory recently suggested dispersing low-methoxyl pectin in water, then adding milk powder and flavor.[9] Calcium salts in milk powder dissolve sufficiently slowly to develop a uniform gel structure with dissolved low-methoxyl pectin. Except for the facts that two packages were required and that contents of the packages had to be dissolved in a definite order, the dessert mix based on that suggestion was successful.

We present here a modification which removes the disadvantage of a two-package mix and involves a recipe that yields a rapid-setting, smooth and tasty dessert. The recipe comes later. First we consider the factors and technics upon which the improved product is based.

Low-methoxyl pectins employed in this investigation were prepared by alkaline hydrolysis in solution, as described earlier.[9] The methoxyl contents were between 3.1 and 3.4 percent, and intrinsic viscosities ranged from 3.0 to 3.6. Little work has been done with samples outside of this range. It appears, however, that heterogeneity with respect to methoxyl content is undesirable. For example, a mixture of pectic acid and pectin which analyzes 3.2 percent methoxyl is not satisfactory.

The skim milk powder was a commercially spray-died product.

Cocoa was a commercial sample prepared by the Dutch-process method.

How Desserts Were Evaluated

A dry mixture of the composition shown in Table I was used for testing the preparation of gelled desserts. The dry ingredients were mixed and then poured into one cup of cold water, with stirring by a household mixer. Stirring was continued for 2 min., then the creamy mixture was poured into molds. After standing for 5 min., the dessert was subjectively tested for firmness of gel structure, rate of gelation, syneresis and presence of grainy particles. The amounts of pectin, sugar and sodium carbonate were occasionally varied to improve the quality of the test dessert.

Effect of Fine Grinding

To increase its rate of solution, low-methoxyl pectin was ground in a hammer mill to pass 325 mesh and incor-

TABLE I—Recipe for Testing Milk Puddings.

Low-methoxyl pectin	3.0g.
Sucrose	50.0g.
Skim milk powder	30.0g.
Cocoa	10.0g.
Salt	1.0g.
Sodium carbonate	0.25g.

7 MINUTES after starting, the dessert is dumped from the molds, ready to serve and eat.

DESSERT MIX

porated in the test dessert mix. Dessert prepared from this mixture was weakly gelled, lumpy and of poor texture.

The finely ground pectin was reground, together with the other ingredients of the mix except the powdered milk. This improved the test dessert, but it still was unsatisfactory because a few lumps formed.

Spray Drying Pectin and Sucrose

Proceeding with the idea that it is necessary to increase the rate of solution of the low-methoxyl pectin, drying of solutions of the pectin and sugar was tried. Ratios of sugar to pectin in these solutions varied from 10:1 to 25:1, while the solids content was maintained at 40 percent. Drying in a laboratory-model spray dryer produced fine white hygroscopic powders. Test desserts made with these compositions showed some lumping, and they were satisfactory only if the ingredients were freshly prepared.

In one case, a 20:1 sugar-pectin composition was stored until the sugar crystallized. When this material was ground, it made a satisfactory test dessert.

Drum Drying Pectin and Sucrose

Solutions of low-methoxyl pectin and sucrose in water were prepared. In these, the solids content was kept at 60 percent, and the ratio of sugar to pectin was varied from 5:1 to 25:1. The solutions were dried on a laboratory model over-fed, steam-heated, double-drum dryer. Conditions were altered when necessary to obtain the best operation for different compositions.

The product dried more easily at the lower sugar-to-pectin ratios. Some difficulty was experienced at 15:1. And at 25:1 no product was obtained under any of the drying conditions tested. At lower ratios, dry white flaky products of low hygroscopicity were produced. These drum-dried products, varying only in the sugar-to-pectin ratios, were tried in test desserts. The dry ingredients were intimately mixed by passing them through a coarse screen in a hammer mill.

The results with test puddings, summarized in Table II, show that better puddings are obtained from higher sugar-pectin composition. And the results indicate that the rate of solution of low-methoxyl pectin is sufficiently rapid to produce a smooth gel when calcium ion is supplied by milk powder. Lumping of the test desserts can be reduced by coarse grinding of the ingredients in a coffee mill.

In one experiment, casein was used—equal in amount to the pectin—with a sugar-to-pectin ratio of 15:1. This composition was more easily removed from the rolls than that without added casein. The texture of the test dessert was very satisfactory. The characteristic flavor of the casein was, however, imparted to the test dessert. This experiment suggests that some tasteless water-soluble polymer might be used to facilitate drying.

Effect of pH on Quality

The pH of the dessert is dependent upon the amount of sodium carbonate added and the acid content of the low-methoxyl pectin, cocoa and powdered milk. The optimum pH for the dessert has been established as near neutrality. Latitude in pH is possible and allows control over pudding characteristics. Lowering of the pH increases firmness, rate of setting and syneresis. Raising the pH has the opposite effects. Values of pH approaching 8 prevent setting at the concentrations used. From consideration of flavor, setting time, and other dessert qualities, the useful pH range is 6.8 to 7.1.

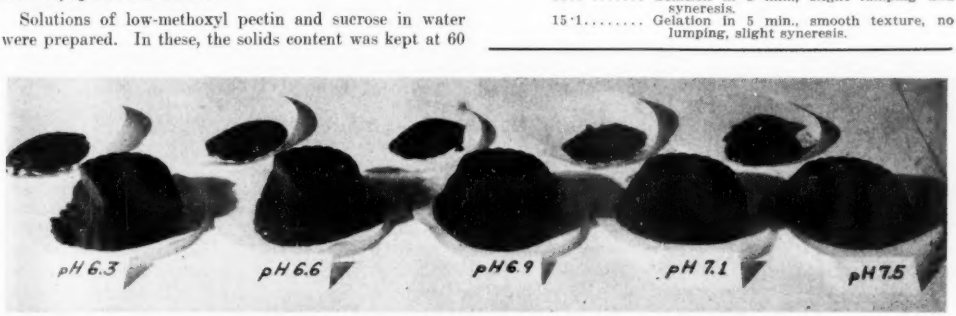
Hard Water Not Harmful

The average water hardness in various cities throughout the United States varies from 50 to more than 150 ppm., expressed as calcium carbonate. Acceptable gelled desserts

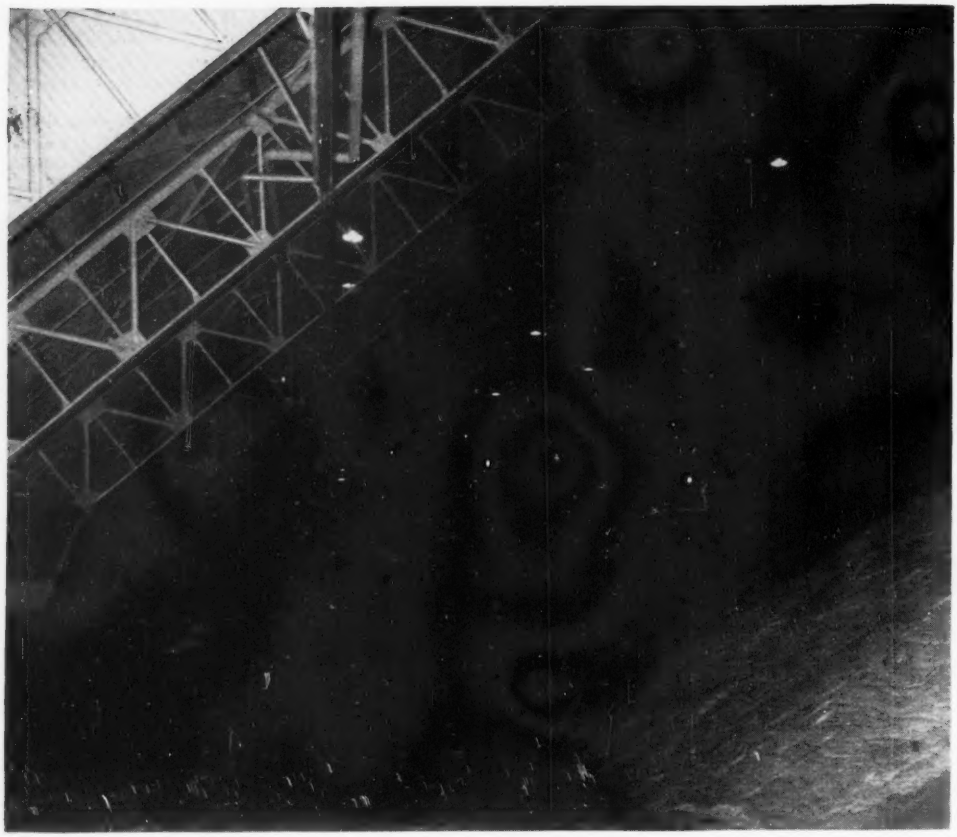
(*Turn to page 180*)

TABLE II—Effect of Sugar-Pectin Ratio on Formation of Milk Pudding.

Sucrose-to-Pectin Ratio	Results
5:1.....	No gelation.
10:1	Gelation in 5 min., slight lumping and syneresis.
15:1.....	Gelation in 5 min., smooth texture, no lumping, slight syneresis.



EFFECT OF pH on body of dessert is shown here. Increasing pH decreases firmness, although it produces smoother texture. Optimum pH range for this low-methoxyl pectin is about 6.8-7.0.



ANGLES AGREE. Here, inside new C. & D. sugar storage warehouse, note how piled material's natural angle of repose parallels prismoidal pitch of roof. In apex, overhead conveyor runs length of warehouse, permits dropping material at any point along center line.

UNIQUE BULK-FOOD WAREHOUSE

Is Bringing New Savings In Sugar Storing

Completed by engineers for C. & D. refinery in Montreal, it has prismoidal shape, based on sugar's angle of repose, thus eliminating heavy wall reinforcement and minimizing waste space

FE STAFF

Construction of a prismoidal shaped warehouse—a structure unique in the sugar industry—has solved a major problem for Canada & Dominion Sugar Co. in Montreal. Credit for the design and construction goes to F. H. McGraw & Co., New York City.

Warehousing had posed a major problem in the operation of the Montreal plant, which relies on boat deliveries of raw sugar from the British West Indies, Australia, Mauritius, and other sugar producing countries. A regular 22-week shutdown of shipping on the St. Lawrence River during icy winter months necessitates storage of sugar stocks between shipping seasons.

The engineers carefully considered various methods for the storage of 40,000 long tons of sugar, with the primary objective of hitting on a handling system that would capitalize on modern mechanical methods and gravity flow, thus cutting down warehouse-operation costs. Once such a system

was devised, the structure to cover it was important in that it had to (1) be well insulated against widely ranging temperatures and humidities and (2) provide a maximum amount of space at the lowest possible construction cost.

A dilemma was posed: The concrete silo appeared, at the outset, to be the most utilitarian type of storage bin —but to get the required capacity, a major foundation problem was involved and greater construction costs would have been incurred. As an alternative, there was the conventional rectangular bin-type warehouse—but this required costly, heavily reinforced walls to counteract the outward thrust of the bulk of sugar.

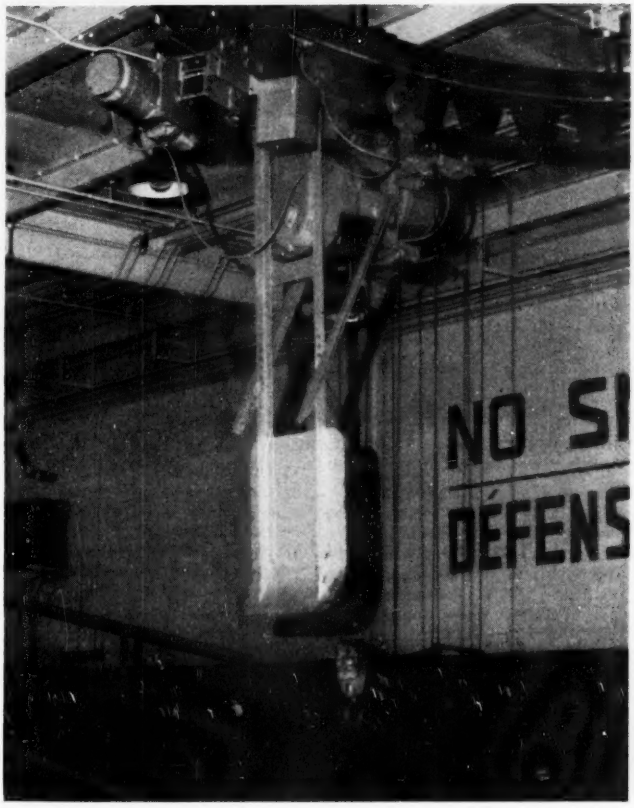
How could these problems be solved? The final answer was—the prismoidal-shaped warehouse.

Such a structure was perfectly feasible because available land was not an obstacle with C. & D. There was a full city block over which the warehouse could build.

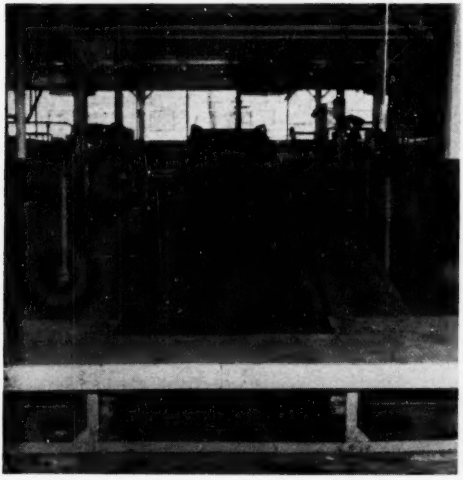
The thinking behind the design was simple and logical. A prismoidal warehouse eliminated heavily reinforced walls and cut down on waste space in that its 39-deg. roof would follow the lines of a raw sugar pile in its natural angle of repose. Construction costs would be considerably less than on other types of structures. The warehouse, now built, is 597 ft. long, 120 ft. wide, and 85 ft. high. It easily stores enough sugar to supply the refinery during the winter months.

In order to control condensation in the warehouse, essential in the storage of raw sugar, lightweight Porete concrete slabs (2¾ in. thick) were used

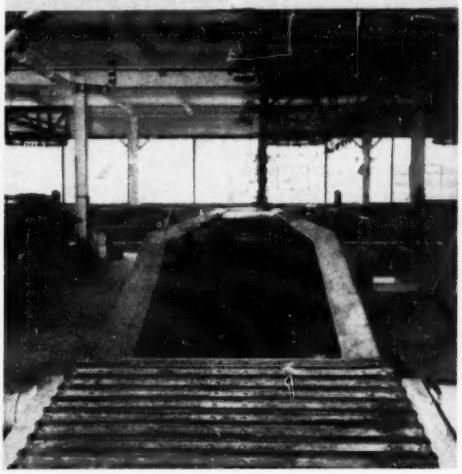
Units That Move Sugar to Storage



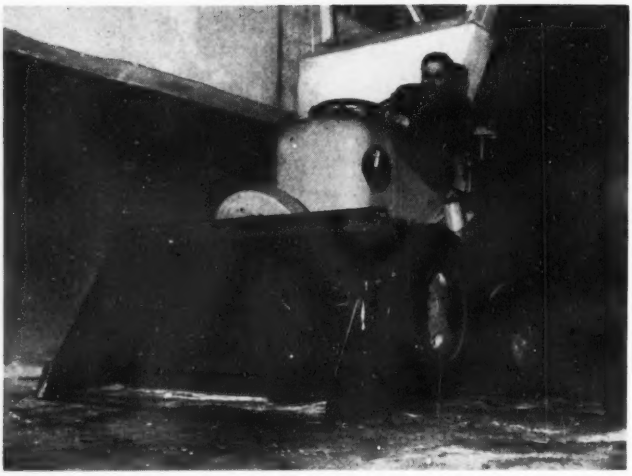
1 **MONORAIL** system is employed to transport bags of sugar from trucks to cutting-in lines. Arm on carrier prevents bag sway.



2 **LOWERED** from monorail to platform (foreground), bags are pushed onto inclined slat mover and go to . . .



3 . . . **TOP OF UNIT,** then slide to a belt on which bags are slit. Lifted by trollies (rear), bags are dumped.



RUBBER-TIRED tractor with special bulldozer blade pushes sugar into position directly above warehouse floor openings.

as part of the roof. A 1-in. wood-fiber insulation and a 4-ply S.I.S. Barrett roof was put on top of the slabs. This type roof provides adequate insulation.

Low concrete walls topped by insulated asbestos-cement siding were specified for the end walls of the building. Since the sugar piles up in the shape of a prismoid in the warehouse, there is no thrust against the end walls. Thermostatically regulated heating units help to control humidity in the warehouse. Temperatures are maintained at a minimum of 40 deg. F.

Bulk Handling Was Keynote

Since the main purpose of the new warehouse was to convert bagged raw sugar into free flowing bulk sugar and eliminate expensive handling methods, bulk handling was a keynote in the engineers' recommendations and plans. It is estimated that handling costs per ton will be reduced as much as 75 percent.

Prerequisite to bulk storage at the plant was a rapid method of getting sugar out of bags. Because the plant is more than a mile from the unloading dock, sugar must be trucked from dock to plant through a heavily congested area. A modern cutting-in station was designed. It adjoins the warehouse on the west side.

This cutting-in station is equipped to allow three trucks to unload simultaneously. Trucks used are of the flat-bed type. In operation, three chain-slings are stretched across the bed of the trucks as it pulls up alongside the ship. The slings dangle over the sides of the flat-bed type truck.

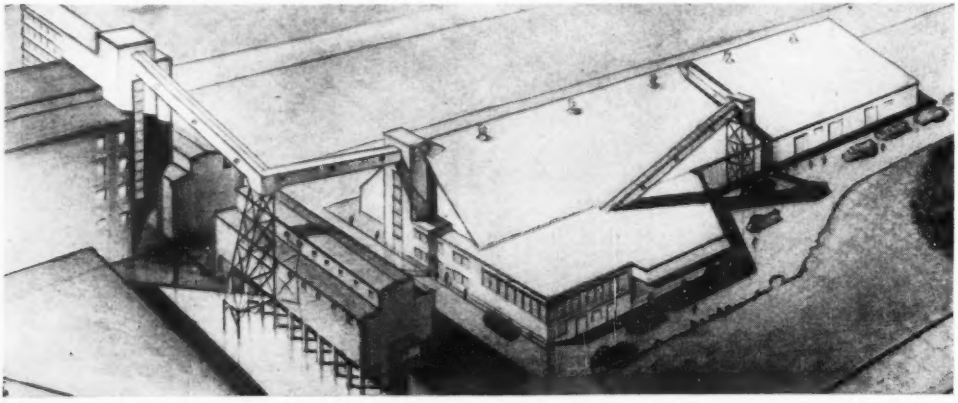
Bags are hauled up out of the ship's hold by ship derrick and placed on the truck's slings. There are generally nine bags placed neatly in pyramid fashion on each sling.

Upon arrival at the refinery cutting-in station, trucks pull up alongside the unloading platform and the ends of each sling are hooked together. Here, one at a time, the slings are picked up on a trolley conveyor and carried through a weighing-in station. Bags are then dropped onto one of three inclined metal-slat conveyors. As they travel on these carriers (rate, 30 ft. per min.), the bags are manually spaced. From the top of the incline they slide down to 48-in. belt conveyors. Bags are cut open manually on these belts, which move at the rate of 70 ft. per min.

Then, at the north ends of the conveyors, hooks are attached to the slit bags, and as the bags move off the belt conveyor, they are suspended from these hooks, which are part of a trolley system. Sugar now falls free into three crushers. Empty bags are conveyed to a pile and subsequently transferred to the washing department. Maximum capacity of the cutting-in station is 300 long tons per hour when employing 325 lb. bags; with smaller bags, the capacity is somewhat less.

After passing through the crushers, the free-flowing sugar drops onto an east-west belt conveyor in a tunnel below the street level. At a point in this tunnel near the west wall of the warehouse, a junction makes it possible for sugar to be directed automatically to either warehouse or refinery. When the refinery requires "more raw," the sugar is continued on its eastward course to a tower directly in front of the warehouse.

(*Turn to page* 117)



ARCHITECT'S CONCEPT of new C. & D. facilities. Enclosed conveyor (right) carries sugar to apex of warehouse. In process, carriers will move sugar across street to top of new affination and carbonation building (left).

How To Operate Under CMP

Here in layman's language are confusion-clearing facts about the puzzling open-end Controlled Materials Plan. This information will help you to keep your plant going in the tough months ahead

EFFECTIVE on July 1, the Controlled Materials Plan is not a priority system. It is a method of scheduling production in proportion to materials supply, and of so alloting basic materials to assure the completion of that production.

CMP has been likened to dividing a pie into smaller and smaller pieces as the number of consumers increases. However, it is not as simple as that. It is more like the operation of a charitable organization, whose collections represent a pool which guarantees a certain level of operations for the year ahead. CMP also has a limited pool—the known productive capacity of our steel, aluminum and copper mills. And it has less in the pool than is needed to make everybody happy.

Like the charitable organization, CMP divides the available materials among the various applicants. The division is not in equal shares, nor even according to requirements. It is in proportion to relative degrees of essentiality.

There is one other point of comparison: In many charitable organizations, a certain percentage of available funds is set aside for emergencies. In CMP, also, a certain fluctuating percentage is to be reserved for non-essential civilian needs.

The name given this type of materials plan is "Open-end CMP."

Open-End CMP Explained

Open-end allocation of materials is flexible in proportion to the ratio of the unreserved portion to the whole supply. It is the objective of National Production Authority to make the new CMP as flexible as possible without restricting defense production and its supporting programs, nor unduly hurting the civilian economy. Civilian necessities are being programmed. But civilian conveniences and luxuries will be obtainable only out of the unreserved materials. This unreserved percentage will vary from time to time, depending upon the relation of supply to the demands of authorized programs.

What Becomes of DO Ratings

Although CMP started officially on July 1, there cannot be any clear cut-off of DO ratings. The present DO's will remain in force until October 1, 1951. By this time, practically all rated orders accepted for delivery after June 30, 1951, will have been delivered. So for three months a two-band preference system will be in force: (1) Delivery orders for controlled materials bearing DO ratings but no allotment numbers calling for delivery before October 1, 1951. (2) Authorized Controlled Material Orders bearing both DO ratings and allotment numbers.

All DO-rated orders for controlled materials will continue to take precedence over unrated delivery orders. But now the Authorized Controlled Material Orders take precedence over all other delivery orders for controlled materials. Each of these two classes of DO-rated orders shall continue to have equal preferential status within its own class as in the past. But those with allotment numbers will take precedence.

Thus, it behooves all holders of DO-rated delivery orders to convert such orders to Authorized Controlled Material Orders with allotment numbers as soon as possible. This is done by sending NPA a new order with the allotment number assigned. Or you may give the allotment number to NPA in a letter stating that it is "certified under CMP Regulation No. 3."

After October 1, 1951, a new situation will exist. It involves all hangover DO-rated orders without allotment numbers for controlled materials which have not yet been delivered. All such orders automatically assume, on that date, equal preferential status with all Authorized Controlled Material Orders, whether or not an allotment number has been applied.

What Food Processors Do

How can a food processor obtain a piece of equipment under the CMP? Unfortunately, the procedure can be defined only loosely at this writing.

The first step is the usual one which a processor takes once he decides to buy, say, a new filling machine. He will order from a catalog after study of several different makes. If the supplier accepts his order and actually delivers, the processor is lucky. But if the supplier has 50 orders on his books and has been allotted materials for only 25 filling machines, he will tell all his clients to get DO ratings.

Eventually the DO rating may be obtained through the nearest office of the Production & Marketing Administration. As of now, however, the necessary administrative machinery has not been set up. Therefore, a letter should be sent to the Office of Materials & Facilities, Production & Marketing Administration, U. S. Department of Agriculture, Washington.

This letter should fully describe the machine desired and give the value, purchase-order number, date of the order and the name of the supplier. The letter also should include a statement from the supplier as to whether he can deliver the machine by the date specified if the purchaser supplies a DO rating. He can ship to the first 25 DO holders.

Let's see what happens to the other 25 purchase orders, since all applications for ratings are handled alike: Unfortunately, no guarantee of receipt of a DO rating is possible. Receipt of the necessary rating will depend on a number of factors, including: (1) Essentiality of the product or products for which the machine will be used.

BULLETIN

For third quarter, MRO allotment is 100 percent of first-quarter use. For capital additions, allotments of steel, copper and aluminum, respectively, are: canning—90, 83 and 85 percent of first quarter; baking—80, 68 and 71; dairy—78, 67 and 71.

(2) Whether the production is restricted by any NPA material orders, such as by can order M-25. (3) Whether the machine will be used in producing Army rations or set-aside orders of canned fruits and vegetables. (4) Whether the machine is required because of local or federal regulations, or in the interest of public health or safety.

There may be other reasons for needing the equipment, such as individual hardship. And all such points should be included in the application letter to Agriculture.

The procedure followed in granting the DO rating is of interest. The pertinent industrial specialist in OMF will use all the information provided by the applicant to prepare for him an NPA-GA-3 application form for his filling machine. This then goes to the appropriate PMA branch in Agriculture for concurrence. Unless a general policy has been established which justifies immediate concurrence by the Branch chief, the application is routed via the commodity specialist within the branch.

The latter must prepare a memorandum to his chief, giving reasons for approval or disapproval of the application. If it is not approved, OMF will advise the applicant of the decision immediately and give the reasons therefor. If the application is approved by the Branch, it still has to be authorized by the section

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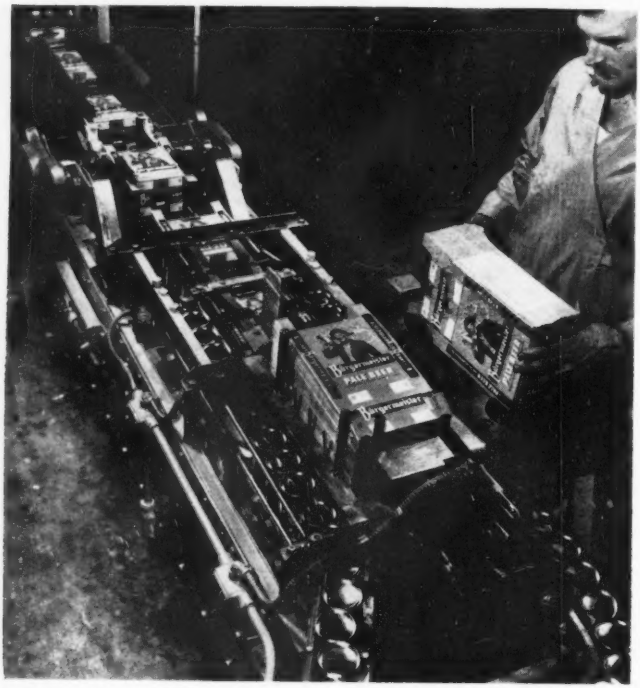


QUICKLY in and out. Two rows of cans come in (foreground), are loaded into set-up cartons (center), then cartons go to gluer and sealer (rear).

"Carry-Homes"—60 a Min.

This is brewer's performance with special unit that sets up, loads, glues, seals 6-can display carton

ADOPTION of a new six-can, carry-home beer carton, called the View Pack, and a special machine that automatically erects, fills, glues, and seals it, has brought four notable benefits to the San Francisco Brewing Corp.:

- **Production of 50 to 60 cartons per minute—which will readily handle output of a brewery-can line.**
- **Increase of 10 percent in sales due to novel display feature of carton. All but a scant margin at top and bottom of each can is visible to shopper.**
- **Savings in costs. Less paperboard is needed for the open-face cartons (only 111 tons per million), despite double board at stress points. They are printed in 4-color process (by Container Corp. of America), yet cost less than conventional cartons in but two colors.**
- **More rapid chilling of product due to virtual lack of sides to carton.**

How Cartoner Works

Here are details of the cartoning operation: Cans of beer are delivered to the View Pack machine by two conveyors, one on each side of the unit (see photo). Automatically separated into groups of three, cans move in line with the opposite group along lanes of the machine. Between them is the magazine from which flat cartons are fed, set-up, loaded with six cans (three from each side), and then given spot applications of quick-drying adhesive on glue points as they pass on through.

Unlike most cartoning machines with the compression conveyor that grips the carton to hold the glue flaps in position as the belt carries it along, the new machine is equipped with gripping plates. Mounted on synchronized, endless conveyors over and under the carton flow, these plates grip each package individually and carry it through the glue-drying period through the discharge point of the machine. Correct positioning on the carton's glue flaps is assured by rubber-faced metal fingers on each plate. These fingers clamp shut automatically, then open again at end of cycle.

Attendants refill the carton magazine and operate the semi-automatic casing unit—the sole manual actions.

The easy-to-handle carton and special cartoning machine were developed by King Sales & Engineering, Inc., San Francisco.

In addition to beer, other canned foods such as soups and frozen concentrated fruit juices can be put up in the new carton.

Nylon Is Answer In New System Guarding Bulk Food

Long search for foolproof way to scan stored-grain temperatures leads to special development—a nylon-sheathed thermocouple cable that will help cut huge losses

FE STAFF

A new protective weapon is guarding bulk-stored food in 1951.

This is a nylon-covered thermocouple cable, developed for easy scanning of bin temperatures, and already at work solving one of the toughest problems of our nation's graneries.

The old way of taking bulk temperatures involved the suspension of steel thermocouple-bearing pipe into the bin. While fairly widespread, this system never took complete hold due to cumbersome installation and maintenance problems.

It is claimed that this new nylon cable overcomes all shortcomings of pipe installations and adds a few special "extras" on its own. Some of the benefits are—

- **Resistance to abrasion, due to resiliency and smoothness of the nylon.**
- **Protection against breakage, due to "built-in" steel strands.**
- **Ease of installation, due to cable-type design and light weight.**
- **Flexibility in use, due to special plug and receptacle construction.**

What's more, while designed for grain, the latter two benefits make this new cable scanning system particularly applicable to other bulk-stored foods, such as potatoes and peanuts. In fact, it holds much promise for any straight warehouse storage of perishables where temperature trends are important.

Let's now take a look at the situation which prompted the development of this unusual cable:

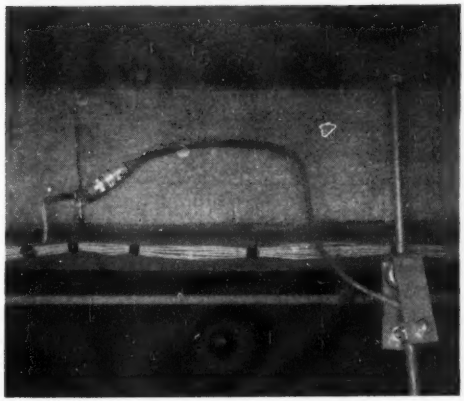
Grain deteriorates in storage—as does most unprocessed foods. In grain, however, the primary ravage is insect infestation. Insect-caused spoilage in stored grain, in the average bin, has been running from a low of about 5 percent in good years to as much as 50 percent damage when conditions are adverse.

It is estimated that insects eat into our nation's stored grain to the tune of over $500,000,000 yearly. To the individual elevator owner this can mean as much as a loss of $2,000 per bin in shrinkage and dockage.

With grain storage facilities growing each year as the U. S. assumes greater responsibility for world feeding, these huge bulk-storage losses can be ill afforded. New tools to protect the grain stockpile have been eagerly sought.

Infestations in stored grain are characterized by a temperature rise in the locality. If this "hot-spot" can be

Cables that can "take it" . . .

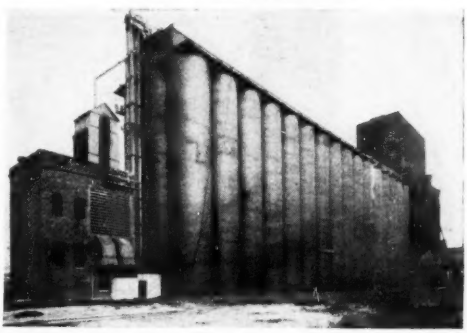


CLOSEUP of cable. It's connected to leadwire with aviation-type coupling. Cable-suspending clamp is anchored in concrete ceiling. The bunched lead wires run to panel (seen in the photograph below).

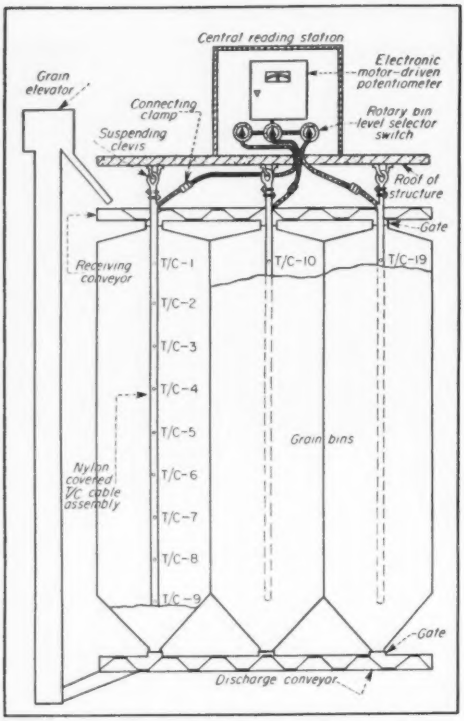
. . . enable fast, sure scanning . . .

HE PUSHES button, then scale (center) gives temperature 60 ft. down in Bin No. 27. Note leadwires coming in (upper right).

. . . of great number of bins



FIRST equipped with new nylon cable system was this New York Central Grain Terminal at Indiana Harbor, Ind.



LAYOUT of new system for scanning a typical grain elevator. Here, central reading station is in housing atop bins.

MAKEUP of scanning elements. At left is a nylon-covered bin cable. Note that it incorporates four built-in supporting groups of steel wires (large bunches), along with three groups of thermocouple wires (smaller bunches) embedded in nylon around these supports. At right is an individual nylon-insulated thermocouple cable assembly (such as used in cable at left). It includes six color-coded copper wires and one common return constantan. To form measuring points, the copper wires are welded to the constantan wire at regular, 6-ft. intervals.

detected, the grain can be removed from the bin and aerated or dried, thereby inhibiting further insect damage. Thus, the scanning of grain temperature at intervals is an ideal check.

Many ways have been devised to make these checks. However, the trend to larger storage structures was thought to have practically eliminated all means but a system of suspending temperature-measuring elements inside a steel pipe carried down into the center of the bin.

In the U. S., thermocouple wire has been most commonly used in such pipe installations, with measuring points (hot-junctions) located several feet apart. The thermocouples are then run away from the bin via leadwire in conduit, to a central-reading indicating potentiometer.

As stated, however, pipe installations have had inherent shortcomings preventing their universal adoption. Chief problem is the tremendous pull and force of the grain itself. Under such pressure, even heavy duty pipe curls up and sometimes breaks. Replacement of this broken member is a major undertaking for the average elevator operator.

A German concern was first to eliminate piping by employing a flexible cable that could be suspended into the bin. This utilized resistance thermometer bulbs for measuring points, with the cable totally enclosed and protected by a braided metal armor. While employed extensively in Europe, this construction has never been widely used in America because of much greater bin heights and also because of cable damage laid to the abrasive qualities of certain native stored grains, such as corn and soybeans.

Consequently, a few years ago a group of practical grain people (since incorporated under the name McCann, Lang and Kelso and operating in Des Moines, Iowa) began work with a wire specialty manufacturer (Revere Corp., Wallingford, Conn.). This was the start of their quest for an ideal bin-temperature measuring element.

Biggest stumbling block in the development of a satisfactory cable was found to be the abrasive trait of the grain—in this case corn. The kernels, tumbling down into a 90 ft. bin, were found to cut right through a heavy duty stainless steel braided armor. Other materials similarly failed.

Nylon Solves the Problem

And then, conventional means failing, the manufacturer suggested a super-strong prefabricated nylon cable that the firm had developed for marine towing during the war. And in preliminary tests, this nylon proved an ideal protective material.

Accordingly, a sample bin-cable was made and subjected to approximately 4 years of hard use (empting and filling of grain) in a 90-ft. corn bin.

■ **Not one scar appeared on the smooth nylon surface and no signs of construction weakness or failure marred its performance.**

The new cable also proved itself in other respects. Tensile strength, for one thing. As did its marine towing counterpart, it contained steel strengthening wire bunches embedded in its nylon matrix as well as the thermocouple measuring wires. This gave it a tensile sturdiness far in excess of the enormous grain forces found in the largest bins. It easily met a 7,500-lb. load in the 90-ft. test bin.

Further, the durable nylon covering of this new cable was found to cope with any abnormal atmosphere which might develop in storage. Fuming nitrate was the only acid which visibly affected it.

Then, with the cable prototype established, a great deal of thought was given to construction and accessory details which would make the scanning system easy to lay out and install. Various cable sizes were developed, each containing extra bundles of the thermocouples to permit use

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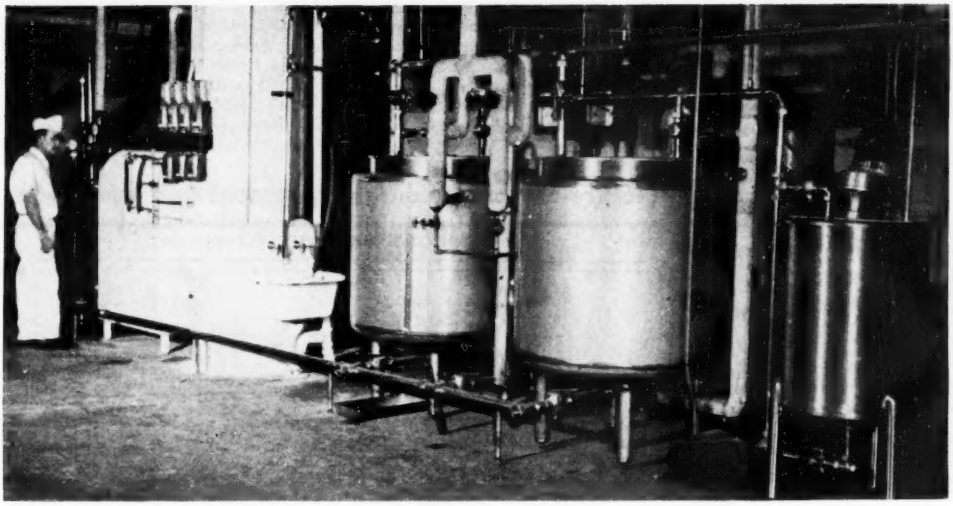


COMPACT continuous marshmallow line is stainless steel throughout. It can turn out up to 1,200 lb. of product per hour through Oakes machine (left). The new process was selected because of the many benefits which it offered.

They Picked a *Bonus Process*

It pays to look at the latest in process design. Shift to continuous marshmallow production proves this with better product at lower cost

W. J. LANCASTER Ass't Plant Engineer
DANIEL H. WING Chief Chemist
S. P. KESSLER Biscuit Div. Sup't
Robert A. Johnston Co., Milwaukee, Wis.

Most food processors tend to stick to tried and proven equipment. They remember the obstacle course to past improvements—and often a lot of tedious work and money that went into something that just wouldn't pan out.

But if you are now faced with expanding or replacing process equipment in your plant, our advice would be this: Consider new ways of doing the job—even if untried—before sticking to the old.

Today is an age of accelerating progress in food equipment design. Problems of sanitation and quality control, peculiar to our industry, are understood by engineers now at equipment manufacturers' drawing boards. And logical, sometimes even simple, innovations are appearing daily which can make obsolete even the most time-honored way of doing a job.

Our continuous-flow marshmallow processing line tells such a story. We formerly made this filling for our cookies by batch mixing in ten 40-qt. beaters. These were in need of replacement, and we methodically went about investigating new, larger capacity equipment for the process.

At this time a new and relatively untried method of continuous beating had just come along. Setting this up not only would involve an unpredictable novel machine, but would also require the installation of the pumps, pipe and tanks necessary to a continuous-flow process. While such an approach seemed a radical and troublesome departure from our established batch process, we decided to consider the new possibility.

New Way Offered Many Benefits

On investigation, we were surprised to find that the total cost of a complete installation using this continuous machine was about one-half that of replacing our old beaters with new and larger ones. Yet the process would boost our marshmallow production capacity to 1,200 lb. per hr.

Further, we discovered that the new, continuous system would require less floor space. And only one attendant would be needed to operate a process formerly requiring two.

In the face of these obvious advantages, we decided to install this new method of producing marshmallow. And now, after a considerable period of usage and minor improvements in our process line, we have become aware of "bonus" features of the system. Not fully apparent to us when we made our decision, the bonus items are:

- The line uses less gelatin and still gives a better product.
- The equipment requires much less maintenance.
- The process allows easier and better sanitation.

The decision to replace our old process with this new one was fairly easy to make on the basis of immediate advantages alone. And the above bonus factors have really made the project pay off in a big way.

Straight-Line Efficient Process

Here is how the new process works:

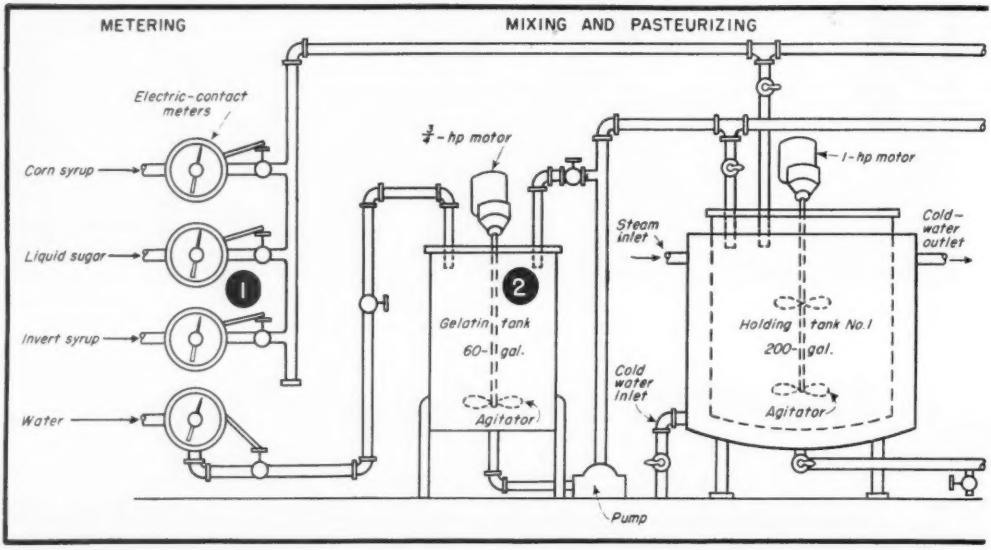
First step is metering an exact quantity of water to the 60-gal. stainless steel gelatin tank through a

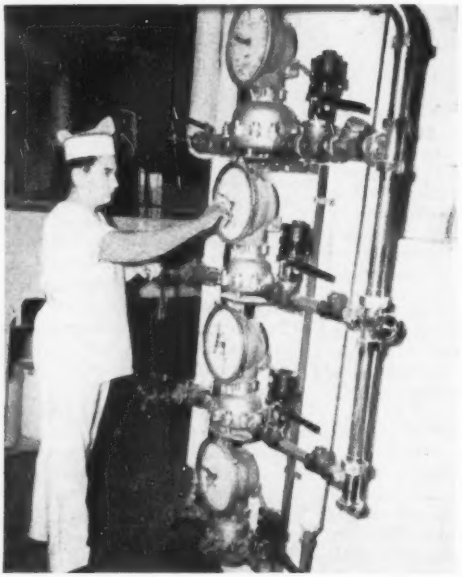
Niagara electric-contact meter that automatically shuts off when an exact quantity has been delivered to the tank. A weighed quantity of gelatin then is slowly added to the water in the tank, the gelatin being dissolved with the aid of an agitator clamped to the tank.

While the gelatin is thoroughly dissolving, other liquid ingredients are fed through an overhead pipe into a 200-gal. stainless steel jacketed vat. These ingredients are corn syrup, liquid sugar (sucrose), and invert syrup. All reach the vat from tank storage through pipes in predetermined and automatically controlled quantities. A battery of electric-contact meters, similar and parallel to the water handling system, effects the controlled additions.

All liquid ingredients are then agitated and pasteurized to about 200 deg. F. for approximately 1 min.

Picture-Flowsheet Shows Equipment and Operations





1 LIQUID INGREDIENTS are metered and automatically delivered to process in exact amounts by these Niagara electric-contact meters.

2 GELATIN is weighed exactly before dissolving in water in 60-gal., stainless steel agitator-equipped tank in right background.

Following this, the mixture is cooled somewhat by running cold water through the vat jacket. Then the gelatin solution is pumped over and added to the batch. Mixing continues until the vat contents are cooled to 90 deg. F.

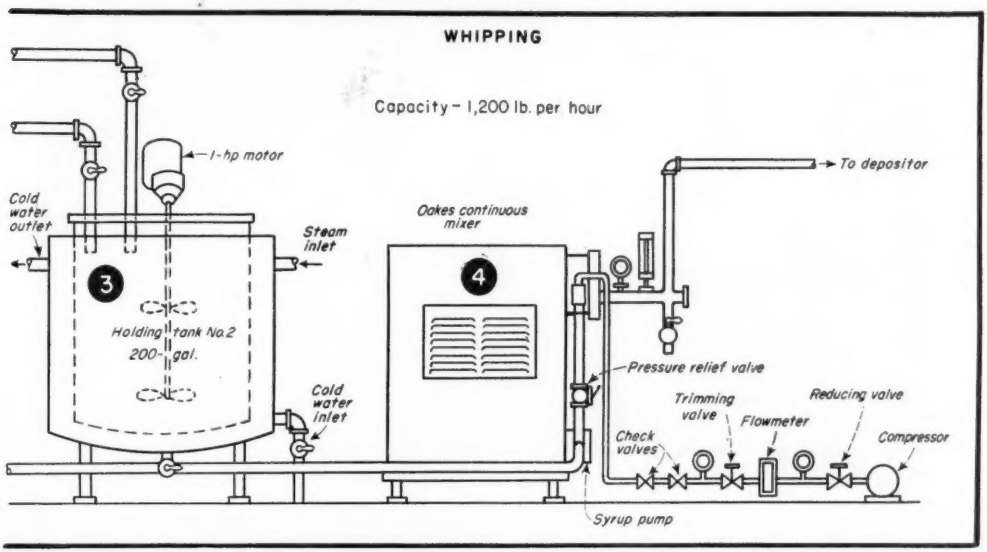
To provide a semi-continuous feed to the Oakes continuous mixing machine, two pasteurizing vats are used, as described above. Indicating thermometers on each allow a positive check of the time-temperature factors for each batch.

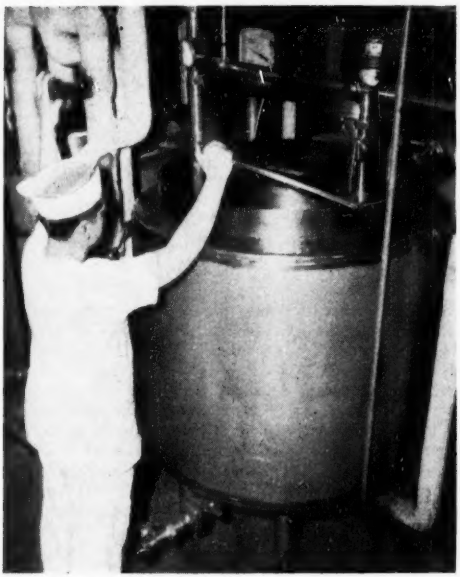
After cooling, vat contents are gravity-fed to the Oakes machine. The mixer pump then takes over and forces the ingredients into the machine's small whipping head. However, just before this action, a controlled amount of compressed air is incorporated into the product.

In the mixing chamber—which has a

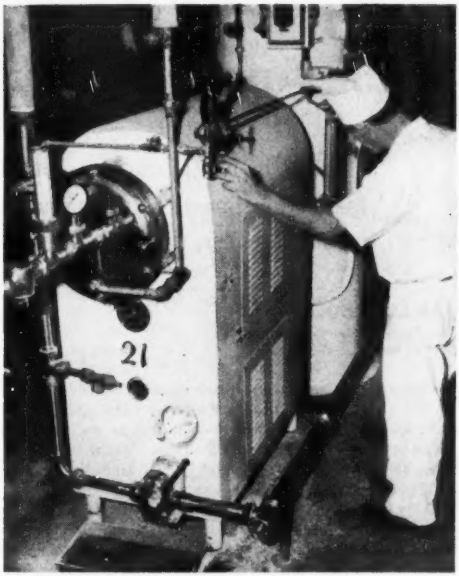
(*Turn to page* 123)

In Efficient Continuous Marshmallow Process





3 **MIXING AND PASTEURIZING** of ingredients are done in this 200-gal. jacketed vat. Two of these are used alternately to supply Oakes machine continuously.



4 **WHIPPING** of the ingredients with air takes place in small mixing head at the front and top of Oakes unit. Operator checks flow meter for air-flow rate.

COMING FROM mixer (rear), dough is fed into hoppers supplying four extruders that continuously form 76 ropes.

IF IT'S *VOLUME* YOU WANT

The Answer Is Continuous Straightline

Halter's had to multiply its output of pretzel sticks—and did it with a fast-action lineup of units that extrude 76 ropes of dough, whisk them through cooker, salter, and oven, then speedily cut, dry, and pack them

JAMES L. DOOLEY
Vice-President, Halter's Pretzels, Inc., Canton, Ohio

Continuous straight-line production of 600 lb. of pretzel sticks per hour—with only six workers required—is now being attained by Halter's Pretzels, Inc., at its Canton, Ohio, plant.

Moreover, this same line can be quickly switched to twisted-pretzel output by merely activating a built-in battery of 16 high-speed AMF tying machines (development of these special types was detailed on pages 48-52, Aug. 1949 FI).

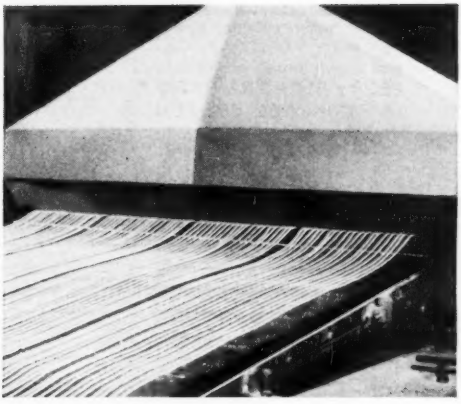
First, a breakdown of the six workers' duties on the high-volume pretzel-stick line: One man operates the flour-handling and mixing units, and he also divides and feeds the dough into the extruding machines. Another tends the continuous cooker, oven, and dryer, as well as the salter and cutter. A third keeps the packaging department supplied with cartons, shipping cases, and rolls of waxed paper, and he also transports cases of finished goods to the warehouse. Finally two girls run the automatic weighing and filling machines, while a third girl operates the carton-wrapping unit.

Starting from the beginning on the pretzel-stick line, the initial step is mixing the dough to a uniform consistency. Different lots of flour are automatically blended, sifted, and then conveyed to a scale hopper, which is rolled on an overhead trolley to the two mixers. After the correct amount of flour is weighed into a mixer, sugar and vegetable shortening are added and water is metered into it. Hot and cold water feed into one pipe from two lines, with the temperature of the combined water regulated to about 50 deg. F.

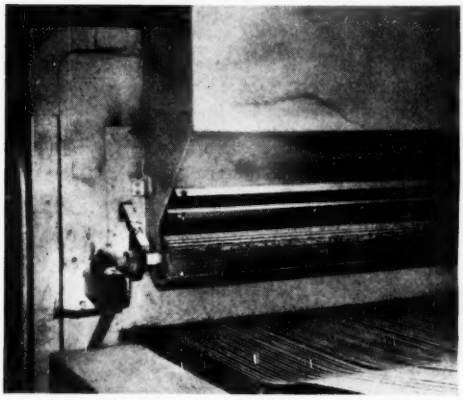
When the dough gets to the proper consistency, the mixer is tilted and each 300-lb. batch of dough is dumped

(*Turn to page* 121)

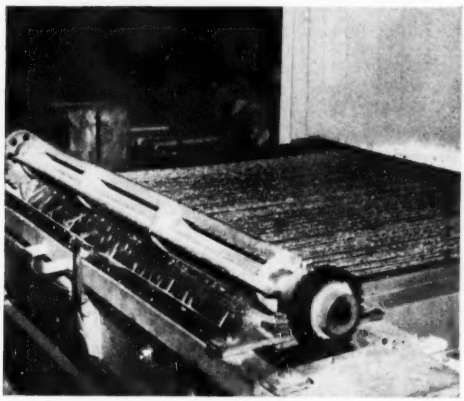
1 **SPECIAL** roller transfers dough from 50-ft. belt (bottom) onto carrier (top) feeding cooker.



2 **HERE,** dough goes through cooker, where it's heated 15-sec. in caustic solution at 190-200 deg. F.

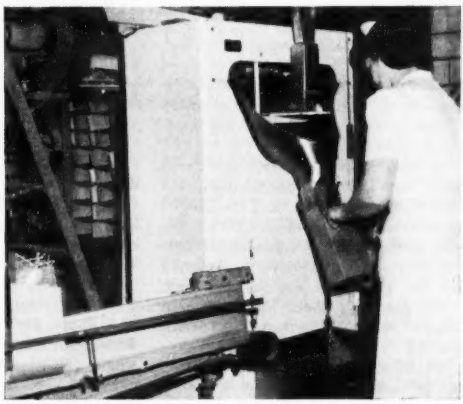


3 **BEFORE** dough enters oven (rear), salt is uniformly distributed on it by this grooved roller.

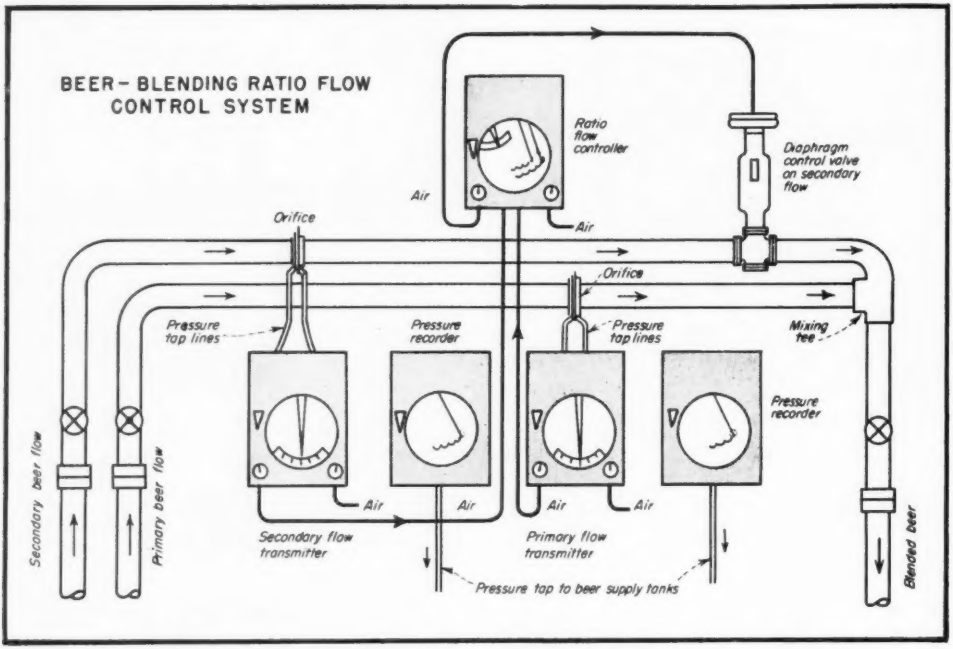


4 **ROTARY CUTTER** snips pretzels into sticks. Speeds of cutter and oven-conveyor are synchronized.

5 **PRETZELS** are discharged from 95-ft. dryer onto conveyor that transfers them to the packaging department.



6 **THIS PACKAGING** machine weighs and fills sticks into cartons. Latter are machine-wrapped with wax paper.



CONTINUOUS BLENDING of two beers is achieved by this system. Two instruments measure flow in beer lines and actuate ratio controller that operates flow valve. Other instruments record beer tank pressures.

Non-Stop Liquid Blending

Unusual flow control system at Minneapolis Brewing outmodes old batch blending methods—saves time, cuts costs and improves beer uniformity

DEWEY KIEWAL and LLOYD SLATER
Respectively, Superintendent and Master Brewer, Minneapolis Brewing Co.; and Assistant Editor, "Food Engineering"

Flow engineers call brewing a "backward child" when they compare it with methods in the other big fluid-process industries.

A good sized brewery moves as much amber fluid through pipe in the course of a day as a full fledged petroleum plant. But one factor has held back equal sophistication of beer handling technics—beer is designed for the gullet and not the gas tank.

Of necessity, then, beer has been babied while petroleum has been pushed.

So when a brewer starts handling his product with petroleum efficiency —that's news. And that's exactly what is happening at Minneapolis Brewing Co., where beer is blended continuously by an instrument flow control hook-up that was practically weaned on refined oil.

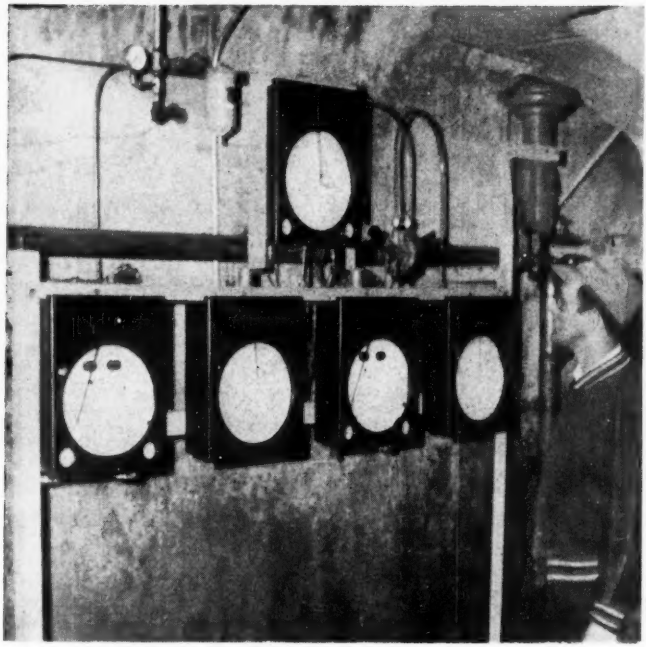
Here's what this brewing innovation provides:

- **Closer control of alcohol content than the most exact batch blending.**
- **More dependably uniform taste characteristic in robot-blended beer.**
- **Complete elimination of blending errors due to human failings.**
- **Drastic simplification of maintenance chores for the operation.**
- **Need for only negligible supervision where full-time was required.**

First question is, "Why wasn't this trick applied before?" The answer is that conventional flow meters—normal to non-food fluid control—were hazardous or unsanitary. Either they contained mercury in their meter body or they could not be applied in direct contact with beer due to permanent line-type construction.

So technic adoption relied on a post-war improvement that removed the mercury hazard from differential flow-metering. Substituted was an equally sensitive system of opposed stainless steel bellows to measure fluid pressure drop across a pipeline orifice. It was found that this "dry" type meter body was both sanitary and flexible enough to meet the varying flow conditions found in brewing.

With this new meter, then, many simple flow control problems throughout the brewery are soluable. Minneapolis Brewing recognized this—but then jumped a few steps ahead and, with the aid of Brown instrument engineers, tackled a complex problem



CAMERA VIEW of blending system. Instruments are at convenient eye-level height. Key instrument is ratio controller above pipeline.

right off. For beer blending relies on a controlled ratio of two beer flows and is a fluid-handling technic requiring considerable flow-engineering background.

Briefly, ratio flow control involves the proportioning of one controllable flow (called secondary) with another uncontrolled flow (called primary). Its object is to maintain an exact ratio between these two flows, despite variations in the primary—usually the main production stream.

To accomplish this, orifice plates are installed and the two flows are gaged by "dry" flowmeter transmitters. Flow rates, in the form of two variable air signals, are thus transmitted to the ratio flow controller—which houses the special mechanisms capable of controlling a valve in the secondary flow stream in proportional fashion. In this manner, should primary flow deviate, automatic adjustment of secondary flow rate will again establish the desired ratio between flow streams.

Beer Blending Applies

This ratio flow control technic seemed to just fit the company's blending procedure. Previously, various beers were pumped from storage into large batch blending tanks. A full-time attendant managed this operation by filling to estimated tank levels and operating mixing motors to secure complete blending.

After a batch was made up and thoroughly mixed, it was run into a special room for filtering and then through government check meters into storage tanks.

It was a simple matter to install control system components along the filtering room wall to provide a simplified continuous flow system using a minimum of space and piping. The new set-up freed the blending tanks for other use and provided an in-pipe mixing that was even more thorough than the old time agitation.

Two pumps were available for delivering beer flow. One, with a capacity of 120 bbl. per hr., was set-up to provide the primary, or uncontrolled flow of beer through a 3-in. line. The other, with a 35-bbl. per hour capacity, fed the controlled secondary beer flow into a 2-in. line.

Stainless steel orifices were calculated for flow conditions and installed in the parallel lines. Several pipe diameters downstream from the secondary flow orifice a 1-in., brass-body, double-seated control valve was located—its sizing calculated to suit the widest flow conditions that might be met. The two pipes were joined, beyond the control valve, in a mixing tee.

The two flow measuring transmitters and receiving ratio flow controller were wall-installed just underneath the piping assembly. This provided a compact, central supervision point for the whole process. In addition, two pressure recorders were added to the instrument group. These measure beer supply tank pressure—it was found that a steady "head" of 25-35 psi. helped to smooth out flow control.

How It Works

Here's what the system accomplishes at Minneapolis Brewing. The major blending problem involved 3-to-1 proportioning of two beers to form the premium product. A simple adjustment in the ratio flow control instrument was found to "fix" this 3:1 ratio with unusual precision.

To clarify system mechanics, let us first look in detail at the ratio flow controller. This is a conventional two-pen instrument that records both primary and secondary flows through reception of air signals from indicating flow transmitters on each line.

However, two other devices are in this instrument case. One is a remote index setting mechanism—operated by output air from the primary flow transmitter. This "index set" is adjustable—it can be fixed to move only a percentage of the chart while the pen associated with the same transmitted air signal will move over the entire chart. This adjustment is the one "fixing" the 3:1 ratio mentioned above.

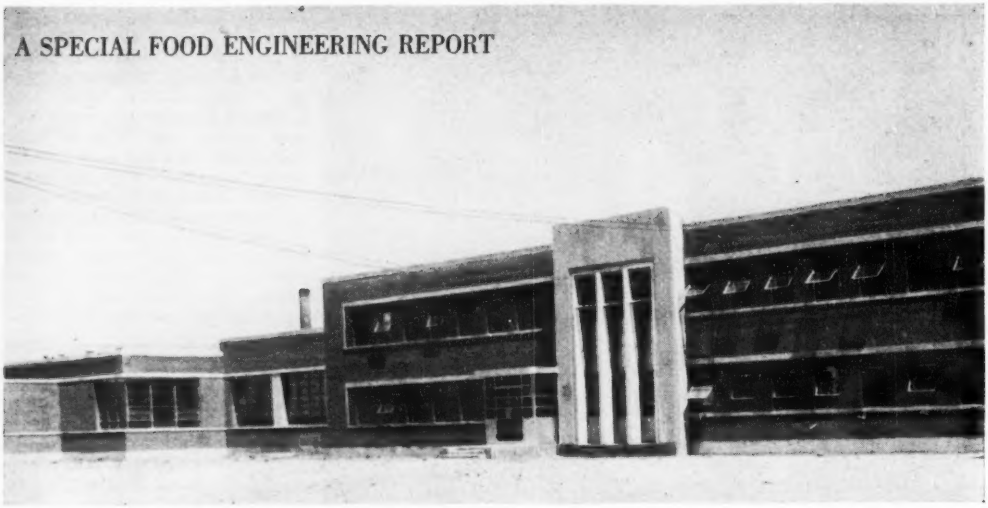
The other mechanism in the ratio flow controller is a proportioning air control unit equipped with automatic reset. This device is operated through mechanical linkage (by the spacial relationship between secondary flow pen and the remotely set index). It controls position of the air-operated valve in the secondary flow line—thus preserving the desired ratio of secondary to primary flow.

Take a condition where the primary flow of beer suddenly alters from 90 bbl. to 75 bbl. per min. due to some change in pumping conditions or fluid supply. Under previous conditions, the control system would allow a secondary flow of 30 bbl. per min. But with the change, the system will immediately adjust itself to a controlled secondary flow of 25 bbl. per min.

All control sequences are accomplished pneumatically. A decreased air signal from the primary flow transmitter causes the remote-set index to move down scale 33 percent of this change. This alters its relationship

(*Turn to page 82*)

A SPECIAL FOOD ENGINEERING REPORT



SUPPLEE'S NEW PHILADELPHIA PLANT has capacity of 45,360 units per hour. It was functionally designed to permit

They Call It

Seven years of astute planning "cornerstoned" the striking performance of this new functional plant . . . And this Report "goes right inside"—spotlights the pattern for alert dairymen everywhere, turns up tips for other foresighted processors

ARTHUR V. GEMMILL
Assistant Editor "Food Engineering"

From the standpoint of engineering achievement and economy of operations, the new $2,800,000 Philadelphia plant of Supplee-Wills-Jones Milk Co., is outstanding in the industry. It embodies the latest developments in milk plant equipment, controls and layout, including a number of innovations. And it utilizes handling procedures not previously applied in this field.

■ **Most noteworthy is the advanced use of pallets and fork-lift trucks—for loading and unloading all delivery vehicles and for materials handling within the plant.**

By this system, the time required to load and unload trucks has been reduced approximately 75 percent, the number of times cases are handled manually has been cut from 6 to 2, and the labor required to perform these operations has been nearly halved.

The building itself is functional. Its design incorporated new materials and units that effected economies in construction and improved the utility and appearance of the interior. Its placement on the plot permits easy access to two paved streets yet allows ample room for expansion in two directions.

Careful planning of equipment and its location makes for easiest possible operation and, at the same time, minimizes cleanup.

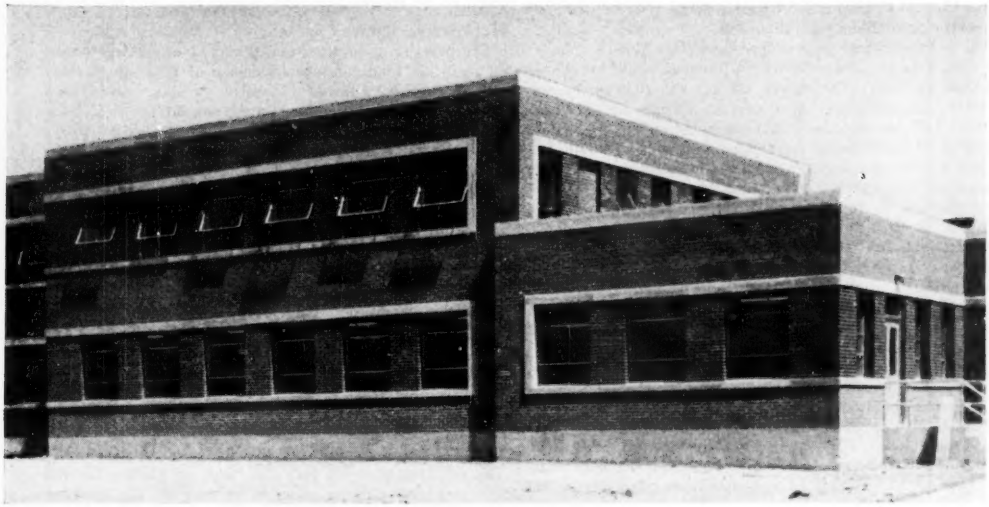
But the physical features of the plant are not the only important elements. Its Tabor Ave. location has made possible a consolidation of operations which have resulted in elimination of four branch plants. Since their operation involved costly transportation and additional handling, the new plant permits a marked saving in trucking charges. To this can be added savings in labor, power and refrigeration that were made possible by elimination of the branches.

■ **All told, advanced engineering, modern construction, improved equipment and materials handling methods, and centralized distribution have been combined to make this a dairy plant that is being called the most modern in the world.**

Choosing the Plant Site

It became apparent more than 10 yr. ago that Supplee's 26th St. plant would have to be enlarged, or a new plant built, to handle the increasing volume of milk business in the northeast section of Philadelphia. Consequently, in 1943, a postwar planning committee was formed to study the problem and make recommendations regarding its solution.

The committee comprised C. E. Frishmuth, then vice-president in charge of sales and now Supplee's president, as chairman; J. K. Bainbridge, sales promotion and advertising manager, secretary; F. S. Kirk, vice-president in charge of engineering; Geo. J. Hauptfuhrer, vice-president in charge of procurement; Samuel Gailey, comptroller; and James M. Wallace, vice-president N. W. Ayers & Sons advertising agency.



continuous-flow from receipt to delivery. Offices occupy the second story, where they do not limit future expansion.

The World's Most Modern Dairy

Because

- **It's cut labor with conveyor-pallet "tie-ins"**
- **Speeded truck loading and unloading with fork-lift handling**
- **Guarded product quality and reduced losses through automatic controls**
- **Attained non-backtracking flow through functional design**
- **Improved overall operations and minimized maintenance through use of advanced equipment**
- **Insured easy future expansion in "flexible" plant incorporating new materials fabricated by latest methods**

At that time two bottling plants (26th and 47th St.) and seven branches were operated in Philadelphia and the adjoining Pennsylvania territory. Supplee's, which is a subsidiary of National Dairy Products Corp., also operates a bottling plant in Camden, N. J., from which are served branches in Wildwood and Atlantic City, N. J.

The Committee Reports

After a careful study, the committee proposed that the 26th St. plant and five of the branches (Jenkintown, Frankford, Darby, South Philadelphia and Germantown) be closed. It further suggested that the routes affected be distributed between the 47th St. plant, the Montgomery County and Chester branches, and a new plant, to be built at an undetermined location.

The main problem then became one of determining where to build the new plant. Primary factor involved here was mileage expended by route vehicles in getting to and from their routes.

Other important factors considered were: (1) Availability of labor supply; (2) transportation facilities for employees; (3) accessibility of rail transportation, and (4) zoning restrictions.

Before appraising these factors, the company scribed the city's 52 wards into 9 major areas (as shown in the accompanying map). This provided a convenient basis for analysis and, also, separated the city into fairly homogeneous areas.

Population Trends Studied

Three proposed sites were considered (see map), and to-and-from mileages were computed for each at these locations. According to these calculations, erection of a new plant by the company at Broad and Lindley would involve the lowest to-and-from mileages. However, this location was not on the Pennsylvania Railroad and, furthermore, indications were seen that population movements might make this site unsatisfactory in the future. Accordingly, a careful analysis of population trends was made. And to-and-from mileages 10 to 15 yr. hence were then estimated, based on the analysis.

In attempting to predict future population movements, three factors were considered:

1. Change in population by areas from 1930 to 1940, as shown by the U. S. Census.

2. Change in population by areas from 1940 to 1943, as measured by building permits, and

3. The number of undeveloped land sites in each area.

Area I (map) had experienced the most rapid growth—gauged as fully 18.6 percent during the 1930-40 census period; an additional 26.6 percent during the 1940-43 period. It was also the only area in the city with a great number of undeveloped land sites. And since the 47th St. plant could serve Areas V through IX when the 26th St. plant and the branches were closed, Area I seemed to be the logical location for the new plant. Incidentally, private residential construction from 1940 to 1950 ("c" on map) substantiates the wisdom of this conclusion.

Based on the above factors, the area near Rising Sun and Godfrey was selected as the one best suited for the new plant. Several tentative sites were considered, and audits were made to measure traffic loads to insure that Supplee's added traffic, superimposed on that already present, would not create cumbersome bottlenecks on streets in this area.

Finally, the location at Tabor Ave. and Harrison St. was selected and the necessary property purchased in December 1944. Plans were carefully made, the contracts let, and construction was finally started in October, 1949. The plant was completed and operations were begun on May 28, 1951.

How Plant Is Laid Out

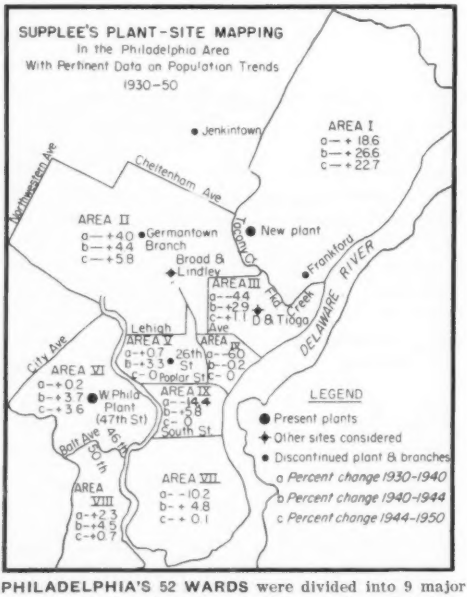
Functional design was applied to the building, to its placement on the plot, and to the location of all equipment. The new plant is situated on the Southwest corner of a level 10-acre plot with entrances on both Tabor Ave. and Harrison St. The rear of the property is bounded by the Reading Railroad, from which sidings were constructed, thus serving the plant through the interconnecting Pennsylvania Railroad as well.

The practice of locating offices and plant services where they will not hinder future expansion of processing areas, yet where they will be convenient to these areas, was adhered to. Processing is carried out on the first floor of this 1½ story building, offices occupy the second story, and a majority of the services are situated in the basement, directly under the processing areas.

Loading and unloading facilities are provided on three sides of the plant, so that incoming supplies and products and outgoing products are moved minimum distances without interfering with one another.

Arrangement of production areas permits flow of: (1) Materials and supplies into the plant; (2) materials in process through these areas, and (3) finished products to storage and to loading docks without crossing the processing lines or backtracking.

Trends Influenced Location



PHILADELPHIA'S 52 WARDS were divided into 9 major areas to provide a basis for population studies. Note location of new plant. This site permitted closing of 26th St. plant and four of Supplee's branch plants.

Milk Handling Simplified

Since milk is received by three different methods—in tank cars, tank trucks, and cans—provisions were made for the separate handling of that arriving by each means. This was accomplished (see diagram) by placing the can receiving and washing room in a wing of the building, locating the railroad siding on the north side of this wing, and the tank-truck unloading room (with accommodations for two trucks at one time) on the south side of the plant, directly in front of the raw storage tanks. Separate pipe lines from the three areas permit transfer of milk from all sources to raw storage tanks simultaneously, and with a minimum of piping.

Two grades of milk are processed at this plant—Grade A and regular. To facilitate handling of the two grades, duplicate receiving equipment was installed in the "direct shippers" room, and each kind of milk is pumped from weigh vats through separate sanitary lines to storage tanks. Lines leading from these weigh vats are equipped with air-operated valves that are electronically controlled from this area. These controls enable the milk receiver to transfer the milk without manual manipulation of valves. Flow of regular or Grade A milk can thus be selected by these push-button controls.

The raw milk storage tanks are equipped with Faratron electronic controls that actuate bells and signal lights, (installed on the corridor walls above each tank) when predetermined levels are reached. These warn receiving operators when individual tanks are nearly filled. They also indicate to plant employees when a predetermined low level is reached.

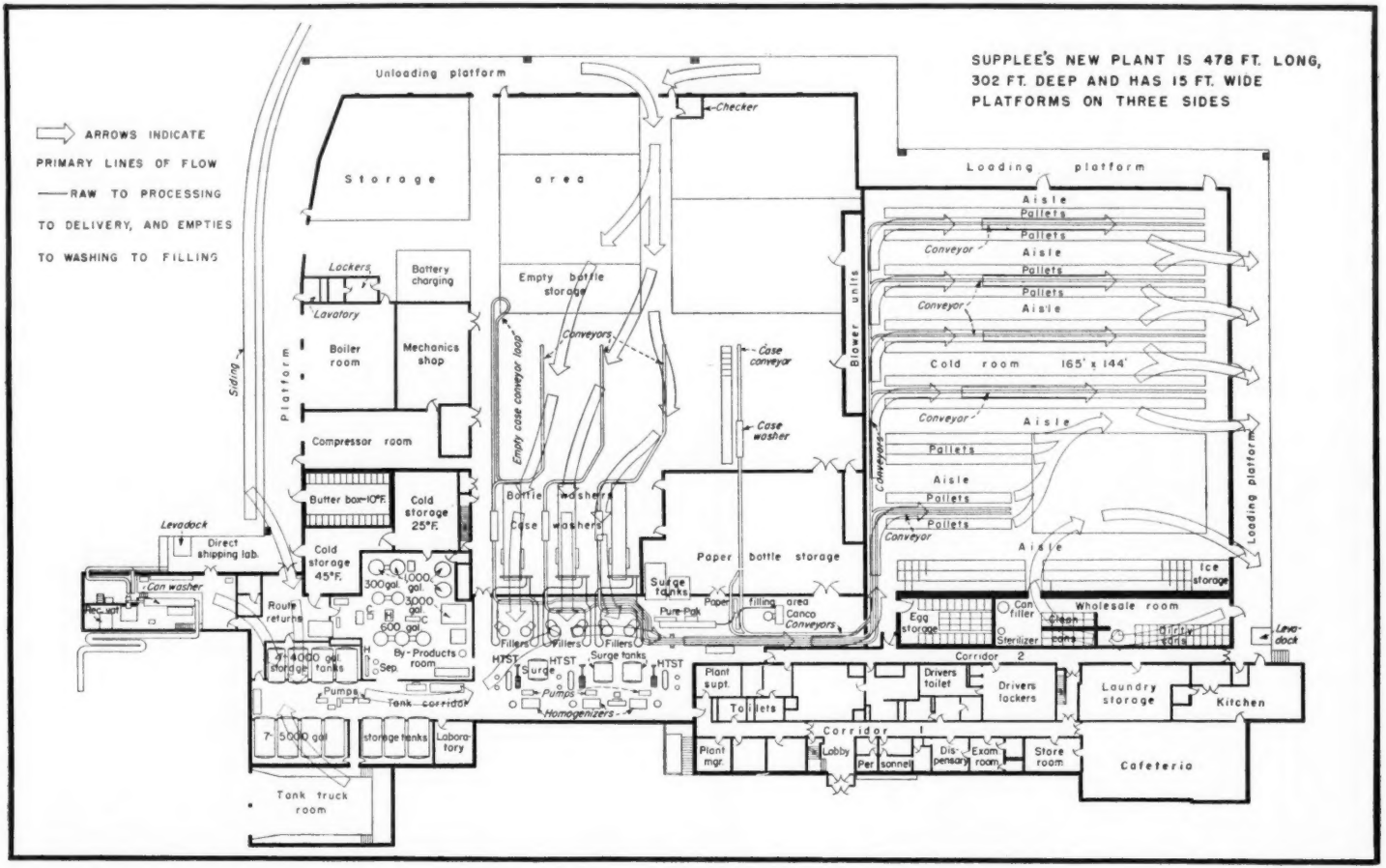
Storage Tanks Form Corridor

Milk received in cans is pumped through a plate-type heat exchanger and cooled to 40 deg. F., or below, on its way to storage. Milk from tank trucks and cars is pumped directly to storage. Storage equipment consists of seven 5,000-gal., and four 4,000-gal. horizontal, cold-wall tanks set in two facing rows. Spaces between the fronts of the tanks are filled in with glazed wall tile, thus a corridor is formed in which only the stainless steel heads of the tanks, the liquid-level indicator dials, warning bells and lights, and sanitary piping and connections are visible.

Advantages of this arrangement are many: Housekeeping is simplified, since product spillage is confined to the corridor, which is easily hosed down; ammonia, air and temperature controls are in the area behind the wall, where they are readily accessible for service and maintenance without interfering with plant operations, and plant appearance is improved.

Temperatures of milk in each of the eleven raw storage tanks are measured by means of thermocouples welded to

Fast-Flow Production Features Readily Expandable Layout



the outsides of the inner walls of the tanks. Recording is continuous on a strip-chart in the laboratory, thus providing, at one convenient location, a complete record of raw product temperatures. An additional advantage from the quality control standpoint is the elimination of temperature-recorder bulbs and mounting accessories that must be removed daily for cleaning.

Agitation in these tanks is by air. This method has several advantages over mechanical agitation: Churning of the fat in the milk is prevented; and off-flavors, such as of grass or onion, are largely removed.

In the corridor are located three small balance tanks and three positive displacement pumps for supplying milk to the processing lines. Each balance tank is equipped with a float-type level control to assure a continuous, uniform feed to the pumps.

Three 20,000-Lb. Processing Lines

In the milk processing room, which is adjacent to the tank corridor, are located three individual pasteurizing lines. Each is comprised of one 20,000-lb.-per-hr. plate-type heat exchanger, one 2,000-gal.-per-hr. Viscolizer, two 11,000-lb. clarifiers, one 2,000-gal. horizontal surge tank, and two 120 bottle-per-minute fillers.

Clean bottles and cases are supplied to each line by a 16-bottle-wide new-type caustic-wash soaker-washer, and a case washer. These units are in a separate room but located so that they discharge bottles and cases through the wall to each processing line. Total bottle-washing and filling capacity of the three lines is 34,560 bottles per hour.

Cases of bottled milk leave the processing room on conveyor lines that move them directly into the large (165 x 144 ft.) cold room. Other cold rooms are provided for storage of butter, eggs, cream, byproducts, and route returns.

Other Products Segregated

Separate rooms, or areas provide for the manufacture of byproducts, the handling of route returns, and the paper bottle operations.

Equipment in the byproducts room consists of two 5,500-lb.-per-hr. cold milk separators, one 800-gal. homogenizer, a small surface cooler for raw cream, a 14,000-lb. surface cooler for chocolate milk and pasteurized cream, and numerous processing vats and surge tanks for cream, chocolate milk and buttermilk.

In the paper-filling room are a Pure-Pak Model F, and a Canco No. 176 filler, and one 5,000 and one 3,000-gal. cold-wall, air-controlled surge tanks. Space is also provided for installation of another paper-filling unit. Present paper-filling capacity is 10,800 containers per hour.

A fully-equipped laboratory is located between the seven raw-milk storage tanks (on the south side of the tiled corridor) and the main processing room, and it faces the byproducts processing room. Here, it is readily accessible to all of the milk receiving and processing operations.

Processing Steps Outlined

Raw whole milk from storage tanks flows into the small float tanks, then to the positive displacement pumps that feed the clarifiers. Next, it enters the plate-units, where it is heated to 161 deg. F.—first being raised to approximately 135 F. in the regeneration section (by the hot pasteurized milk on the other side of the plates), then to the 161 with hot water from individual, direct-steam heating units in the basement below.

When the milk is to be homogenized, it flows from the HTST unit into a small stainless steel balance tank, from which it is drawn into the Viscolizer. Upon leaving the Viscolizer, the milk enters a holding tube, where it is held for 16 sec., then passes through a flow-diversion valve to the regeneration section of the plate unit.

Here it is cooled, first by contact with the cold, raw milk entering the unit, and finally by chilled water from a sweet-water cooler in the basement. This method of cooling has several advantages over brine: The water will not corrode the plates of the pasteurizing units, the pipes, or the pumps; since its temperature never goes below 32 F., there can be no freezing of milk within the plate cooler in case of a temporary shut-down, and ammonia compressors supplying refrigeration to the sweet-water units can be operated at considerably higher back-pressures, thus effecting savings of 25 to 30 percent in electric-power consumption.

Milk that is not to be homogenized passes directly from the heating section of the plate unit into the holding tube, through the flow diversion valve, and thence back to the unit to be cooled. Milk discharges from the plate unit into surge tanks that supply the fillers. Flow from these tanks to the fillers is by air pressure (7 to 10 psi.).

Immediately after clean bottles are discharged from a soaker-washer, they are evenly distributed into two separate conveyor lines, each of which feeds one filler. Filled, capped bottles move to an accumulating table, where they are cased. And filled cases are conveyed to the cold room to be stored on pallets until they are loaded onto delivery trucks the following morning.

Milk Box Specially Designed

Supplee's 24,000 sq. ft. cold room varies somewhat from the conventional one in a large dairy plant, for it is here that the palletized handling system begins. Conveyor lines that bring cases of filled bottles from the processing rooms are separated by distances that are sufficient to enable placement of a row of pallets on each side and yet allow a 10-ft. aisle (the minimum space in which fork-lift trucks can be satisfactorily manipulated).

Since truck loading is not handled by conveyors the usual maze of units for this purpose has been eliminated, as have the openings in the walls through which they travel. Five large swinging doors, directly in front of the aisles formed by the pallets, provide for the coming and going of electric fork-trucks during the loading operations.

During the operating period, filled cases move into the cold room on conveyors. Here, they are removed and placed directly on pallets according to the driver's previously executed order. Part cases and special products are loaded on the pallets at the end of the day, thus completing the individual truck's load. Two pallets normally hold the load for a retail truck. Icing, to keep the milk cold on the delivery trucks, is carried out by placing a small block on top of each stack of filled cases.

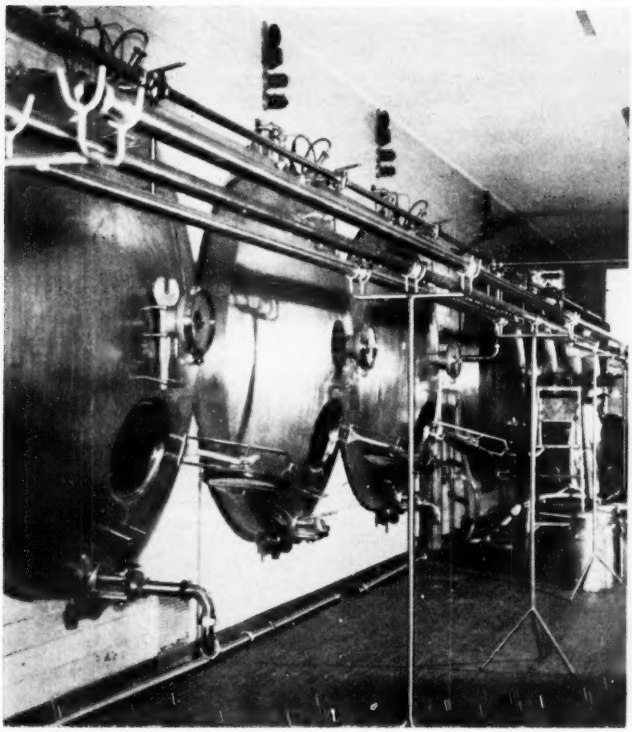
No ice is manufactured at this plant. It is purchased in 300-lb. cakes that have been scored to facilitate easy breaking (with an ice pick) into the desired-size blocks. In this form it provides ample refrigeration for the milk in transit, is more convenient to handle, and is more economical.

At loading time, filled pallets are picked up by fork-lift trucks and loaded directly into delivery vehicles. When the route men return, fork-trucks remove pallets of empties. These are taken directly to the bottle washing room. If washers are not operating at this time, loaded pallets may be stacked three high to conserve space.

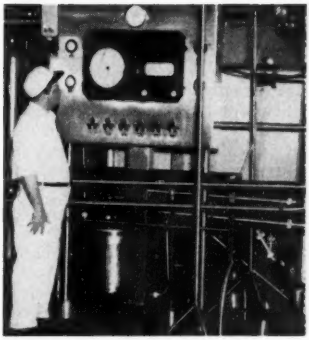
Later, the cases of empties are removed from the pallets and placed on conveyors that feed the washers. Pallets are washed, then moved into the cold room to be loaded for the next day's delivery.

■ **Fitting the pallet system to the milk operation required extensive study and experimentation.**

Highlights of Equipment



STORAGE TANKS are set in tile to form easily cleaned corridor. Note volume indicators on front of tanks and warning bells and lights on wall above.



HTST PASTEURIZERS have indicating and recording controllers.

ACCUMULATOR TABLES are arranged for operator's convenience.

BYPRODUCTS are prepared in room adjoining milk processing room. Shown are "zoned" vats in which level of hot water in jackets is adjusted (by valves at base) to height of product inside, thus preventing burn-on.

FILLERS form line in rear of processing room, where they receive clean bottles from washers (beyond tiled wall), milk from surge-drums (left), and byproducts from preparation room. Conveyors (right) move filled cases.

Conversion from round to square bottles had made the older wooden cases obsolete. So pallet design had to be tied to the newer cases. Finally adopted were aluminum alloy cases featuring light weight and rugged characteristics. They can be palletized without the need for special tying. These cases have better heat-transfer characteristics, are easier to wash, reduce weight of truck load, are easier for men to handle, and reduce bottle breakage.

Pallets were designed to hold unit loads—2-cases wide by 4-cases long. They have iron corner clips and side plates to prevent loads from shifting while being moved. Normal loading is 4-cases high, although 5-high is possible.

Here, width of aisles in the cold room was a governing factor, hence it was imperative that the electric fork-truck's turning radius be the smallest possible. Careful investigation brought to light a truck that would turn within 5 ft. 3 in. This truck is equipped with counterweights fastened to the rear of the battery case, and it is thus capable of handling loads up to 1,900 lb. Trials convinced the engineering department that these units were satisfactory, so six of them were purchased.

■ **But the conventional retail milk delivery body was not satisfactory for direct loading and unloading with fork trucks.**

This necessitated a complete redesigning of the body. As finally built, it takes the two pallets side by side just inside of the rear door. This arrangement permits placing of the small ice-refrigerated cabinet for special products near the front door, where it is easily accessible to the driver and yet allows ample room between the filled cases and the driver's seat for stacking of cases of empties until one of the pallets is unloaded.

By the combination of conveyors and pallets used in this plant, the following notable savings were effected:

1. A reduction of 75 percent in truck loading and unloading labor has been achieved, since individual handling of cases inside the plant was cut from 6 to 2.

2. Time for loading and unloading was likewise reduced. Previously, from 10 to 15 min. were required to load a retail truck, and approximately this same amount of time was needed to unload it. Now, the fork-lift truck operator takes only from 3½ to 4 min. to load the two filled pallets into the body, and an equal amount of time to unload them. Since the driver does not have to handle the cases directly, his job has been made easier. This, together with the time saved in loading and unloading, is expected to result in increased sales per route.

3. Breakage, which previously averaged 2.3 percent, has been practically eliminated, as has the accompanying product loss.

4. Labor required for handling of supplies was greatly reduced. Now supplies are loaded directly from freight cars or trucks onto pallets and moved into their respective storage areas. Later they are moved to their place of use without further handling.

Outstanding Engineering Features

As previously mentioned, functional design was applied to the plant layout, the equipment, and its placement. Each was carefully engineered so as to give the greatest operating economy and convenience, while meeting the rigid sanitary requirements that must be observed in a milk processing plant.

Milk is received at one end of the 478-ft.-long building and moves in a relatively straight line through processing to refrigerated storage and, finally, onto delivery trucks. Empties and route returns are unloaded at another side of the plant and move directly to the empty storage and route-return rooms, respectively. Additional supplies are unloaded onto pallets at this latter platform.

In the processing room, milk moves from front to rear —from storage tanks, through pumps, clarifiers, Viscolizers, heat exchangers, and surge tanks to fillers. Bottles and cases move from the rear of the building through washers to fillers. Then the cased milk is conveyed, at right angles to the other lines, into the cold room.

■ **Conveyor installations were carefully engineered for maximum savings in labor and for convenience of the operating personnel.**

For example, on the No. 1 processing line, which is used to fill a variety of products in different-size bottles, at least one extra man would have been required to take off the empty cases from which the bottles were removed to fill the washer at the start of the day's operation, and to change cases each time different bottle sizes were needed.

To eliminate this extra labor, a conveyor loop (see photo) was installed between the washer feed and the case washer. Now, instead of removing the empty cases at the start-up and replacing them later, the washer feeders allow the cases to proceed around the loop and through the case washer. They then arrive at the accumulating table just as they are needed.

Fillers On Peninsulas

To facilitate free movement of filler operators and save them the need of climbing over or under the bottle conveyors, loops were provided in these lines (see plant layout drawing). Each filler is on a peninsula formed by the empty and filled bottle conveyors and, therefore, is easily accessible for adjustment, inspection and cleaning.

Capped bottles leave fillers on conveyor lines that parallel the ones bringing the empties, then discharge onto accumulating tables (one for each two fillers). Empty cases move up to the accumulating tables at lower levels that facilitate easy transfer of filled bottles into them, then they are conveyed directly to the cold room.

Both empty and filled bottles are conveyed on pallet chains (a special development of Supplee's engineering department in cooperation with Mojonnier Bros. Co.). These are comprised of drop-forged, heat-treated links onto each of which has been welded a small, flat, crescent-shaped pallet. Bottles are moved more gently than on conventional conveyors (cutting breakage), and they are conveyed around corners without transfer tables.

Improved Caps Saved Floor Space

New Dacro bottle closures are being used at this plant. They are of crimped aluminum with paper liners and require only one capping operation. By changing to this process, a saving in materials and labor was effected.

■ **Another engineering improvement that was developed by the Supplee staff and the Geo. J. Meyer Mfg. Co. is the new caustic-spray bottle washers installed in this plant. These were the first of their kind to be used for the washing of milk bottles.**

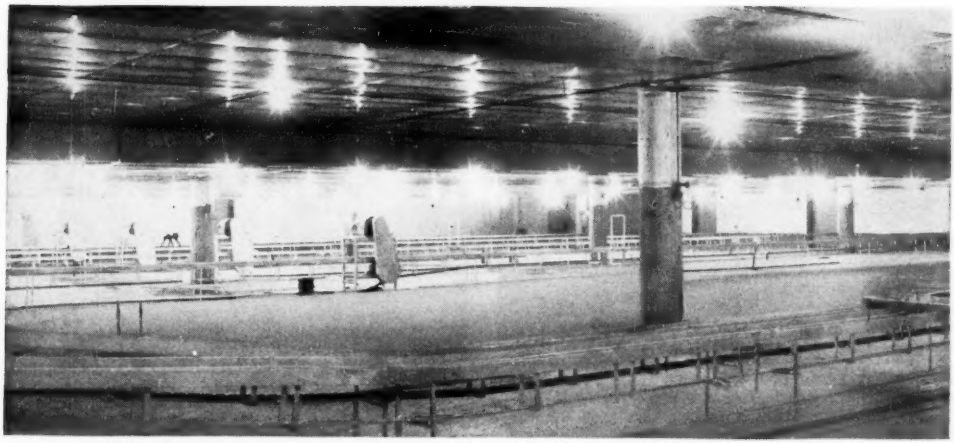
Previously, washer manufacturers have relied upon the natural drainage of caustic solution from the bottles as they were inverted over the soaker compartments, supplemented by either a brushing or final spray to insure clean bottles. Not fully satisfied with the results obtained from this type of washer, staff engineers reasoned that a spray of caustic into the inverted bottles as they were conveyed over the top of each soak tank would greatly improve the efficiency of this part of the washing.

Washers were redesigned to incorporate this feature in the first two soaker compartments, and so successful were the caustic sprays that brushing was found unnecessary.

An additional feature of the new bottle washer is its use of liquid chlorine in the final rinse to give a residual of at least 50 ppm. in the bottles leaving the unit.

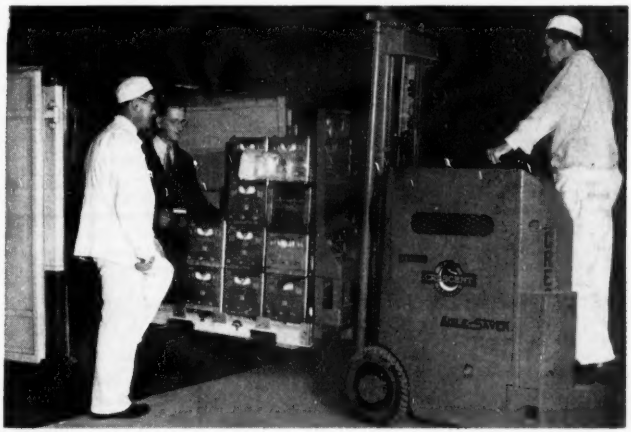
In the manufacture of byproducts such as chocolate

Palletizing Brought New Cold-Room Design, Changed Loading-Unloading



THE HUGE COLD ROOM (144 x 165 ft.) is divided into wide aisles by the five conveyors that bring filled cases from processing room. Large doors at rear are for movement of fork-trucks used in loading delivery vehicles.

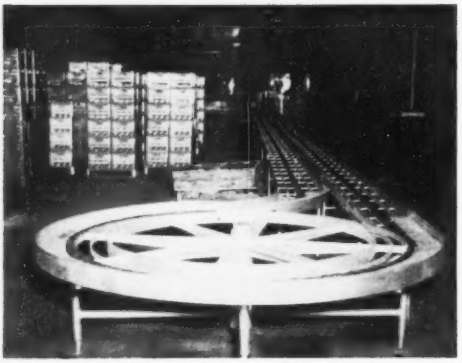
ABOVE: Cases are removed from conveyors in cold room and placed on wooden pallets according to driver's previously made-out orders.



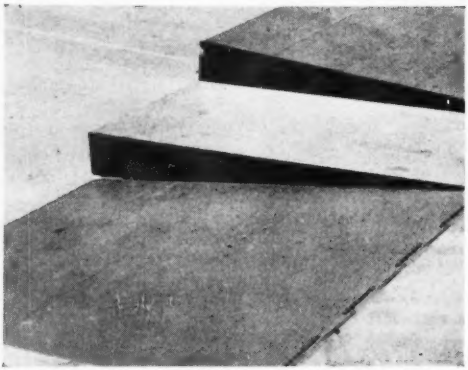
ABOVE RIGHT: Trucks remove loaded pallets from cold room and place them directly into retail delivery trucks. Here, Driver Mike Lazar receives first pallet load of milk at the new plant.

RIGHT: Cases of empties are unloaded by fork-truck and moved to bottle washing room, where they are stacked, three pallet-loads high, beside washer feed conveyors.

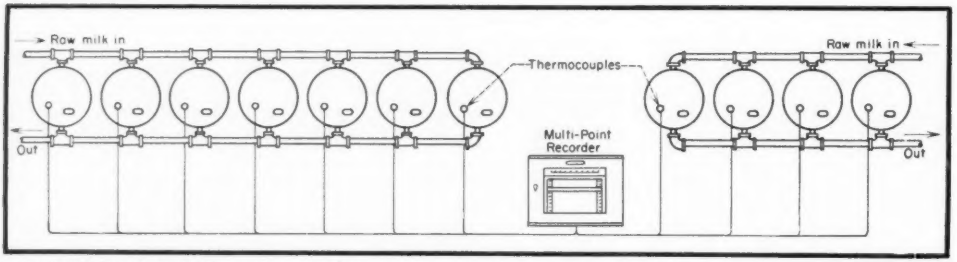
Advanced Engineering Saves Labor, Guards Product Quality



CONVEYOR LOOP that takes up slack between washer and fillers. Without it, an extra operator would be needed to remove empty cases at start of day, and to change cases when different-size bottles were filled.



LEVADOCKS were installed at several locations to facilitate fork-truck loading and unloading when truck floors are higher or lower than the plant's platform. Provision was also made for additional units as needed.



MULTI-TANK RECORDER provides a continuous record of temperatures in the 11 raw-milk storage tanks. Thermocouples are installed in each tank and wired to a potentiometer, in the laboratory, that makes a permanent record on a strip-chart. To provide for installation of additional tanks, a 16-point recorder was purchased.

milk and buttermilk, it is frequently necessary to process part tanks. During heating, the products are splashed against the sides of the tank and burn onto the metal, resulting in a loss of products and a difficult cleaning job.

To overcome this difficulty, vats used for such products were constructed with "zone" heating and cooling. Level of heating or cooling media in the tank jackets is adjusted, by means of manually-operated valves, to the approximate height of the product inside. This prevents the burn-on and also effects more efficient heating and cooling.

Water Heated by Reverse Refrigeration

A notable saving in refrigeration is effected by the use of city water (that later is to be heated for general plant use) to cool pasteurized cream, chocolate milk, and sterilized skim for buttermilk. When these products are to be cooled, whether by pumping over the surface of the cooler or directly in the processing vats, city water is used to reduce their temperatures to approximately 80 F., then it flows to a large water storage tank. Final cooling of the byproducts (when necessary) is done with cold water from the ice-builders in the basement.

In the lower section of the large surface cooler, liquid ammonia is circulated to effect final cooling of products.

In order to eliminate the pumping of raw cream, the small cream cooler was placed on a platform that is high enough to permit gravity flow from the bottom trough into processing vats.

Controls at Key Locations

Maximum advantage was taken of the great advances in automatic control equipment in order to reduce labor and product losses, and protect quality.

As previously mentioned, temperature of milk in each of the eleven raw storage tanks is continuously recorded on a strip-chart by means of thermocouples. The latter are connected with a potentiometer. The minute voltage produced by each thermocouple is opposed to that of a reference cell in a circuit in which the direction of flow of current will be determined by the relative strength of the two voltages. Through electronic amplification, the "unbalance" voltage is magnified so that it can be used to determine the direction of rotation of a powerful balancing motor that adjusts the calibrated voltage until it equals the thermocouple voltage. The recording pen of the multi-point recorder is also moved by the balancing motor so that the temperature at each thermocouple is recorded on the chart. The roll-type chart can be torn off daily, or allowed to run for a 30-day period.

To provide for future expansion in raw milk holding capacity, the recorder was purchased to handle a total of 16 tanks.

Two types of level indicators are used on the various tanks. On the raw milk storage tanks, Levelometers are used. On the pasteurized products tanks, Liquidometers

are employed. Each of these units indicate (on dials mounted on the front of the individual tanks) the volume of milk inside the tank.

As previously described, raw milk tanks are equipped with Faratron level-controllers. These units flash signal lights and ring bells to keep operators informed regarding "high" and "low" levels in the tanks. As a further safeguard, Faratrons on the pasteurized milk surge tanks are connected with processing units so that, should the level in one of these tanks continue to rise after a warning has been flashed, the processing unit supplying that tank will be automatically shut down.

On the chocolate milk and cream surge tanks, Liquidometers (float-operated volume indicators) are used. These units are connected with tank-front mounted dials that indicate the quantity of product directly in can-measure.

Flow diversion valves of the latest design are installed on the HTST pasteurizers to insure desired temperatures. These are air-operated valves through which the milk flows as it leaves the holding tube of the pasteurizer. Operation of the valve is controlled by a safety limit recorder (the temperature bulb of which is located directly in the outlet of the holding tube) and by an electro-pneumatic pilot valve that regulates the position of the 3-way flow diversion valve according to the milk temperature.

If the milk temperature is above 161 deg. F., the recorder positions the flow diversion valve at "forward-flow", a green light appears on the control board to indicate proper pasteurization, and the milk flows back to the plate unit to be cooled.

If the temperature of the milk is below 161 F., the valve assumes the "diverted-flow" position, a red light indicates improper pasteurization, and the milk is returned to the balance tank that feeds the unit.

An additional piece of equipment that goes to make up the entire HTST control system is the product temperature controller. It measures the temperature of the recirculated water entering the heater section of the heat exchanger and operates a control valve in the steam line to the water heater. This pneumatic controller automatically determines the pasteurization temperature.

Automatic re-set response is added to this controller to compensate for fluctuations in steam pressure, variations in flow rates, and other load changes that would normally alter the controlled temperature.

Other Special Features

Processing rooms and offices are air conditioned to control temperature and humidity. In the operation of the units, Supplee's and National Dairy's engineers used an innovation that should result in a definite saving of electricity. In the basement of the plant are two large ice-builders employed to supply cold water to the raw-milk cooler, the two coolers in the byproducts room, and buttermilk and cream vats. Ice is built up in these units by operating ammonia compressors during the night at off-peak electric rates. Refrigeration is supplied to the two air-conditioning units by circulating water from these ice-builders, thus effecting a much more economical operation than could be obtained with the small compressors.

Since regeneration is employed to a great extent in the HTST pasteurizers and in the byproducts operations, need for direct heating is extremely small. Therefore, low pressure (not more than 15 lb. gage) package boilers were installed. These boilers are well insulated and, in addition, are covered with aluminum that provides extra insulation and improves the appearance of both the boilers and the room in which they are installed.

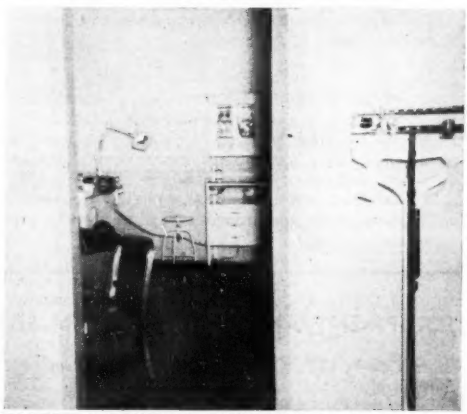
By providing a basement under the processing area and installing the utilities in it, piping has been reduced to a minimum. For example, individual water heaters and sweet-water coolers (to serve the HTST unit in each processing line) were installed directly under these units. Feed and return lines go through the floor. This arrangement minimized the piping and insulation, and practically eliminated service piping from the processing room.

Installation of separate water heating and cooling units for each processing line adds flexibility and minimizes steam and refrigeration requirements. An additional advantage of this arrangement: Easy access to units and piping for maintenance.

Electric services to the various processing units likewise feed through the floor from control panels in the basement. And heated water for cleaning is supplied from storage tanks in this area.

The company purchases its power from the local utility company. Incorporated in the plant is a 13,000v. electrical sub-station which supplies the power. This system is divided into two units, each of which is capable of handling the entire load. The second unit functions as stand-by equipment to be used in event of a power failure.

For Good Employee Relations—



MODERNLY EQUIPPED DISPENSARY and interviewing rooms are conveniently located on first floor of the plant.

CAFETERIA, seating 200, provides low-cost meals for employees. It is also used for group meetings of employees and as a gathering point for visitors.

Units 1 and 2 of the high-voltage switchgear are duplicate incoming-line sections, each containing—

1. A power circuit breaker
2. Three 150/5 amp. current transformers
3. A potential transformer connecting phases 1 and 3
4. Motor for lifting circuit breaker into position, complete with pushbutton switch and relay.
5. Ammeter in secondary of 150-amp. transformers
6. Three over-current relays, connecting all phases
7. A switch to test ammeter and over-current relays
8. A control-power switch
9. Red and green indicating lights, and
10. Three lightning arresters

Evaporative condensers, installed on the plant's roof, minimize water requirements for condensing ammonia from the refrigeration machines.

Details on Plant Construction

The building, of modern design, is constructed of brick with large areas of windows, those of the processing room being glazed with heat reflecting blue-green Coolite, actinic glass.

Interior walls of all first floor areas, except cold rooms, storage and bottle washing rooms, are of buff colored tile. Floors are of red tile and are uniformly sloped toward drains.

Ceilings of processing rooms are of a special cement plaster to which an ivory pigment was added, thus eliminating the need for painting. Doors leading into these rooms are stainless steel-covered for maximum sanitation, durability, and appearance.

In the offices, a sound-absorbing plaster was used for ceilings, and walls are covered with a vinyl resin paper that is waterproof and can be cleaned repeatedly. Floors are asphalt tile. Lobby is finished in rift oak Flexwood.

Another notable feature of the plant is the absence of large numbers of roof-supporting columns. This was made possible by the use of Flexicore reinforced precast concrete ceiling sections. Measuring 21 ft. 8 in. long by 12 in. wide, these slabs require no center supports. When assembled they form a finished ceiling and a satisfactory base for application of roofing. Use of these precast slabs reduced building costs and speeded construction.

Walls of the large cold room are insulated with 4 in. of sheet cork. The floor is of 6-in. concrete. Reflective insulation was used in the ceiling. This consists of four sheets of aluminum foil each of which is separated approximately 1 in. This type of ceiling is stated to resist moisture better than a solid material, was easier to install and, at the same time, provides excellent insulation. Ceiling ducts, which distribute the cold air throughout the room, are made of Transite board and are painted with aluminum to give the entire ceiling a uniformly light, reflective effect.

Overall dimensions of the building are 478 x 302 ft. Platforms (15 ft. wide) extend around three sides. Height of these platforms was governed by floor height of the new retail delivery trucks. For it is important to have these approximately the same for most efficient fork-truck operation.

To accommodate store delivery trucks, with bodies of various heights, Levadocks were installed in the loading and unloading platforms. This type unit is hinged to the platform at one end and is moved by an hydraulic lift at the other. By adjusting their height (up or down) to the floor height of the truck body, fork trucks are enabled to drive into the bodies.

The large cold room is held at the desired temperature by circulating air from unit coolers located outside the

EQUIPMENT AND MATERIALS IN SUPPLEE'S "MOST MODERN" PLANT

Storage tanks (12), Cherry-Burrell Corp., Chicago, Ill.
Surge tanks (5), Cherry-Burrell Corp., Chicago, Ill.
Surge tanks (2), Mojonnier Bros. Co., Chicago, Ill.
Byproducts processing vats (10), Mojonnier Bros. Co., Chicago, Ill.
Plate-type heat-exchangers (4), Cherry-Burrell Corp., Chicago, Ill.
Surface coolers (2), Mojonnier Bros. Co., Chicago, Ill.
Can washer (1), Lathrop-Paulson Co., Chicago Ill.
Can washer (1), Rice & Adams Corp., Buffalo, N. Y.
Centrifugal milk pumps (6), Cherry-Burrell Corp. Chicago, Ill.
Positive displacement pumps (3), Bump Pump Co., La Crosse, Wis.
Positive displacement pumps (3), Waukesha Foundry Co., Waukesha, Wis.
Float controlled tanks for raw milk (3), Mojonnier Bros. Co., Chicago, Ill.
Balance tanks at Viscolizers (3), Stainless Products Corp., Portersville, Pa.
Weigh tanks (2), Lathrop-Paulson Co., Chicago, Ill.
Receiving vats and controls, Rice & Adams Corp., Buffalo, N. Y.
Cream separator (1), The DeLaval Separator Co., New York City, N. Y.
Cream separator (1), the Sharples Corp., Philadelphia, Pa.
Clarifier (1), The DeLaval Separator Co., New York City, N. Y.
Clarifiers (3), The Sharples Corp., Philadelphia, Pa.
Viscolizers (3), Cherry-Burrell Corp., Chicago, Ill.
Homogenizer (1), Manton-Gaulin Mfg. Co., Everett, Mass.
Fillers (2), Cherry-Burrell Corp., Chicago, Ill.
Fillers (4), Crown Cork & Seal Co., Baltimore, Md.
Bottle washers (3), Geo. J. Meyer Mfg. Co., Cudahy, Wis.
Case washers (4), Mojonnier Bros. Co., Chicago, Ill.
Case conveyors, Mojonnier Bros. Co., Chicago, Ill.
Bottle conveyors, Mojonnier Bros. Co., Chicago Ill.
Paper bottle forming and filling machine (1), Pure-Pak Div., of Ex-Cell-O Corp., Detroit, Mich.
Paper bottle filler (1), American Can Co., New York, N. Y.
Can Filler (1), Cherry-Burrell Corp., Chicago, Ill.
Flow diversion valves (3), Taylor Instrument Companies, Rochester, N. Y.
HTST pasteurizer controls (3), Taylor Instrument Companies, Rochester, N. Y.
Potentiometer temperature measuring and recording system (1), Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Push-button air-operated valves, Powers Regulator Co., Chicago, Ill.
Levelometers (11), Liquidometer Corp., Long Island City, N. Y.
Liquidometers (7), Liquidometer Corp., Long Island City, N. Y.
Stainless steel piping, valves and fittings, Creamery Package Mfg. Co., Chicago, Ill., and Alloy Products Corp., Waukesha, Wis.
Ammonia compressors (4), York Corp., York Pa.
Electric motors for compressors (4), Westinghouse Co., Pittsburgh, Pa.

room. This air is forced to all parts of the room through ceiling-mounted ducts, and uniformly distributed from special diffusers in such a way as to eliminate draughts.

Refrigeration is supplied by five electric motor-driven ammonia compressors. These are located in the machine room on the west side of the first floor. In the boiler room which is adjacent to the machine room, there are three 300-hp. low-pressure, oil-fired boilers. Other equipment in this room includes oil transfer pumps and a feed-water storage tank.

"Human Engineering"

In planning the new plant, careful attention was paid to the problems of "human engineering."

When choosing the site, transportation for employees was an important factor. Therefore, the planning committee discussed this matter with the Philadelphia Transit Co. and was apprised in considerable detail that plans had been made for suitable future development in this area.

A well equipped dispensary and interviewing rooms are centrally located on the first floor of the plant, and a large cafeteria provides meals to employees at low cost.

Locker and shower rooms have tiled walls and floors for maximum sanitation and ease of maintenance. Featured units in these rooms are stainless steel Bradley basins. Toilets are set off the floor for easy cleaning, and lockers are set on concrete and tile bases.

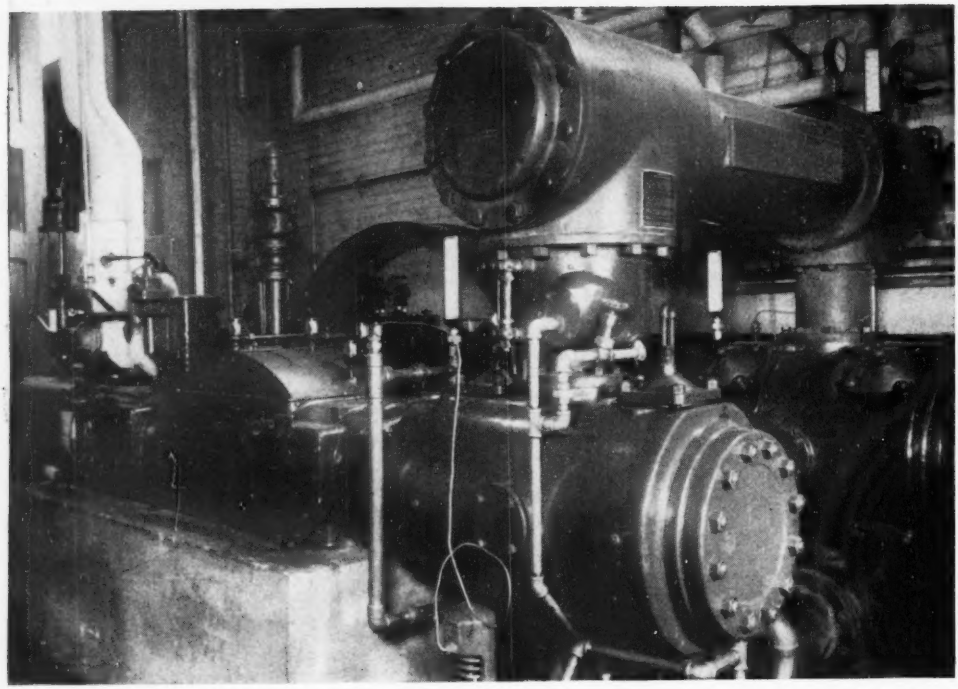
The cafeteria is a multiple-use room. Its kitchen can be closed off by an aluminum rolling shutter and the tables removed to provide a meeting room with a seating capacity of approximately 200. This facility is used for sales meetings and as a gathering place for groups being conducted through the plant.

FIRST ONE OFF THE LINE is presented to President C. E. Frishmuth (left) by Plant Manager Malvern Ayres. Watching (l. to r.) are: F. S. Kirk, vice-president in charge of engineering; A. Supplee, vice-president in charge of city plants; and Joseph Crumlish, chief engineer. Bottles (foreground) are being conveyed on special-design pallet chains.

Further Information Regarding These Units and Materials May be Obtained From the Manufacturers Named

Ammonia compressor (1), Frick Co., Waynesboro, Pa.
Synchronous electric motor for compressor (1), Electric Machinery Mfg. Co., Minneapolis, Minn.
Evaporative condensers (5), Niagara Blower Co., New York City.
Water pumps, Davison Pump Co., Beacon, N. Y.
Boilers (3), Superior Combustion Industries, Inc., Emmaus, Pa.
Ice builders (2), York Corp., York, Pa.
Sweet-water coolers (3), Frick Co., Waynesboro, Pa.
Air compressors (2), Westinghouse Air Brake Co., Wilmerding, Pa.
Nash Hytor air compressor (1), Nash Engineering Co., South Norwalk, Conn.
Refrigeration units for large cold room (9), York Corp., York, Pa.
Water storage tanks and heaters, Patterson-Kelley Co., East Stroudsburg, Pa.
Circulating pumps, Worthington Pump Co., Harrison, N. J.
Air conditioning units (6), York Corp., York, Pa.
Electric fork-trucks (6), Crescent Truck Co., Lebanon, Pa.
Electric Work-Savers (3), Lift Truck, Inc., Cincinnati, Ohio.
Hand operated lift trucks (4), Yale & Towne Mfg. Co., Philadelphia, Pa.
Aluminum alloy cases, C. E. Erickson & Co., Inc., Des Moines, Iowa.
Paper bottle cases, Cesco Container Co., North Hampton, Mass.
Levadocks, Rotary Lift Co., Memphis, Tenn.
Wooden pallets (3,300), Cesco Container Co., North Hampton, Mass.
Delivery bodies, (200) Boyertown Body Co., Boyertown, Pa.
Cork insulation, Armstrong Cork Co., Lancaster, Pa.
Insulated doors to cold rooms, Jamison Cold Storage Door Co., Hagerstown, Md.
Reflective insulation, Gronemeyer Co., Wilmington, Del.
Wall tile, Natco buff tile, National Tile Co., Anderson, Indiana.
Floor tile, Hanley Co., Bradford, Pa.
Accoustical tile in cafeteria ceiling, Johns-Manville, New York City, N. Y.
Flexicore reinforced concrete sections, Flexicore Co., Dayton, Ohio.
Transite board, Johns-Manville, New York City, N. Y.
Sanitary pipe cleaners and special sinks for washing fittings, Girton Mfg. Co., Millville, Pa.
Variable speed drives on positive displacement pumps, Reeves Pulley Co., Columbus, Ind.
Faratron level controllers, Lumenite Electronic Co., Chicago, Ill.
Pigmented plaster used for ceilings of processing rooms, "Keen-Tex", Tuckahoe Stucco Co., Tuckahoe, N. Y.
Sound absorbing plaster used for ceilings of offices, U. S. Gypsum Co., Chicago, Ill.
Electrical controls and starting equipment, Allen-Bradley Co., Milwaukee, Wis.
Asphalt tile, known as "Ma-Ti-Co," Mastic Tile Corp. of America, Newburgh, N. Y.

Make Sure It's *In* Right and *Kept* Right



TYPICAL steam-driven, horizontal air-compressor for supplying air for production and other uses in food plants.

YOUR AIR COMPRESSOR
How To Get the Most Out of It

This machine's performance depends on such factors as lubricating, cleaning, cooling, air-supply. Follow the rules and up efficiency. Location important

T. G. HICKS
Assistant Editor, "Power"

Good operation of air compressors in food plants is within the control of every operator. But, to get the most from your machines, you must follow certain basic operating and safety rules.

The average food plant uses at least one air compressor for cleaning, agitation, valve operation, fire protection or tool drive. A few examples of typical applications are: Cleaning (containers, motors, switchgear and production equipment); solution agitation; steam control-valve operation; and automatic sprinkler systems.

In short, the importance of compressors in economical and dependable production of food products has been growing steadily. And accordingly this article has been specially prepared to offer a quick review of the major basic rules for all food plant operators.

Guards Are Important

Prevention of personnel injury through contact with compressor belts, pulleys, flywheels and other moving parts is aided by use of suitable guards. Screens, enclosures and handrails are easily applied after the compressor has been installed. Though such guards increase the cost of an installation somewhat, they are well worth it from the standpoint of greater safety, especially when it is common for persons unfamiliar with machinery to be in the vicinity of the compressor. So it's a good policy to guard all compressors, no matter where they are located.

A good location for an air compressor is a prime point for several reasons. Many factors influencing machine performance depend on the site. Since these factors determine how well and safely a machine operates, it is poor practice to install a unit in any convenient corner and forget it. Neglect of lubrication, intake-air cleanliness, air-cylinder temperature, or inadequate inter- and after-cooling usually leads to trouble. Because many of these con-

siderations depend on compressor location, the importance of where you put it is readily seen.

Allow Ample Room

Install air compressors in a clean, cool place. Leave ample room on all sides for inspection, cleaning and repair of the unit. This includes room for removing pistons, rods, inter- and after-cooler tubes. Excessively hot, poorly ventilated rooms and spaces, also rooms subject to accumulation of dust and dirt, must be avoided.

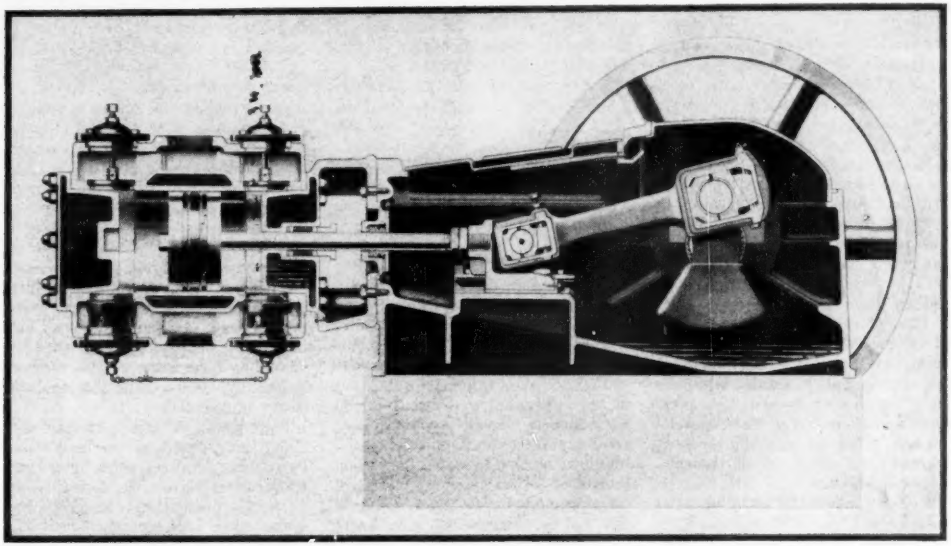
Adequate lighting is essential for all types of work on the compressor.

Foundations should be built carefully and given at least a week to harden before the compressor is installed. Further, foundations should be rugged enough to withstand the necessary vibrations. Mixture of one part Portland cement, four parts broken stone and two parts clean sand is often recommended for foundation construction. The machine should be grouted to foundation, in accordance with the manufacturer's instructions as to thickness and mixture proportions.

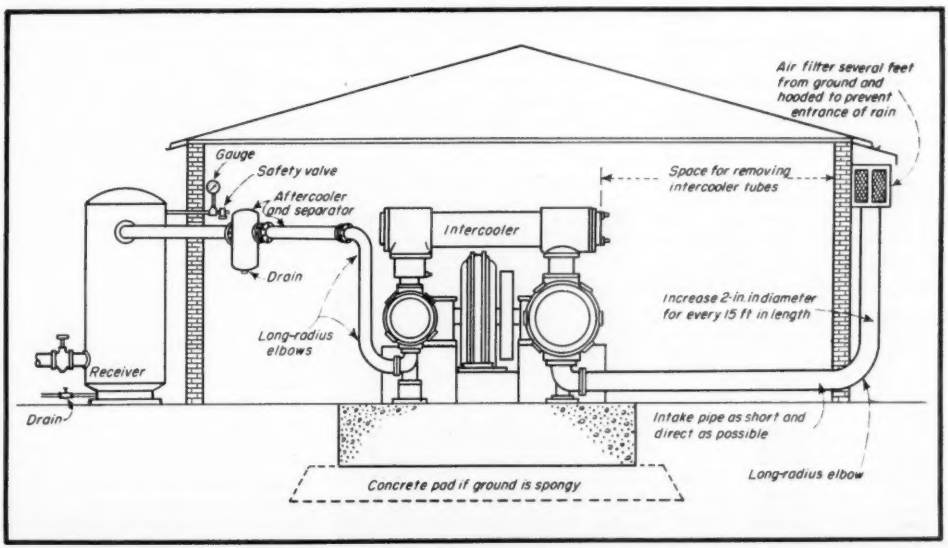
After the compressor is installed, a suitable daily operating procedure must be followed.

Air-cylinder lubrication is one of the

Details of Parts . . . Critical Points in System



CUTAWAY of reciprocating air compressor showing details of valves, piston, crosshead, water jacket and crankcase.


Air filter several feet from ground and hooded to prevent entrance of rain
Gauge
Safety valve
Aftercooler and separator
Space for removing intercooler tubes
Intercooler
Drain
Increase 2-in in diameter for every 15 ft in length
Long-radius elbows
Receiver
Drain
Intake pipe as short and direct as possible
Long-radius elbow
Concrete pad if ground is spongy

COMPRESSOR installation. Detailed are major points to watch when preparing plans for a compressed-air system.

most important phases of air-compressor operation. Proper amount of oil to be used in the air cylinder depends on cylinder size, volatility and viscosity of the oil, and other factors. Incorrect lubrication is often thought to be a major cause of air-compressor troubles. High air temperature in the cylinder may decompose or evaporate an oil film. Decomposition of the oil leaves a gummy mass that may collect around valves and passages. When united with dust from the air, a hard deposit that obstructs valves and passages can be formed. Correct amount of suitable oil is important because it assures safe, trouble-free operation.

Vegetable oils are unsuitable for use as air-cylinder lubrication. In cases where excessive moisture is present, a compounded mineral oil is often employed. The manufacturer will always recommend grade and quantity of mineral oil to be used.

Oil feed rates are usually stated in terms of drops per minute. Where such rates are recommended by the compressor builder they are entirely safe.

When such rates come from "rule of thumb," or any other unprecise source, they should not be used until checked by the machine manufacturer. This caution must be taken because the size of an oil drop depends on a number of factors, including viscosity, temperature, lubricator size, and the service conditions under which the compressor operates.

Minimum allowable oil feed rates recommended by the Compressed Air Institute are given in the table accompanying the article.

Remove Carbon

Deposits from burning or charring of the lubricant are carbon. In some compressors, the carbon is found in dust form instead of solid deposits. In either case, high temperatures encountered during the cycle may ignite the deposits.

Carbon deposits around compressor discharge valves are especially troublesome because they may prevent full closure of the valves. As a result, some of the high-pressure air in the discharge line re-enters the cylinder on the next suction stroke. This air is at a higher temperature than the atmosphere, hence final temperature of the mixture after compression may be high enough to ignite the carbon. It's easy to see why carbon deposits must be removed regularly and thoroughly.

Several methods are used for carbon removal. A soap solution of 1 lb. soft soap and 8 qt. of water is cheap and effective. The solution is fed to the air cylinder at a rate of about ten times the oil feed.

In addition, a lye solution may be fed into the discharge pipe. A solution of 1 lb. of lye dissolved in 10 qt. of water and fed into the discharge pipe by means of a sight-feed lubricator is generally satisfactory. Feed rate should be 60 to 70 drops per minute.

To prevent rust after application of either lye or soap, drain the air receiver and operate the compressor for 30 min. with the normal lubricant.

Hand Cleaning Necessary

Cleaning jobs on some compressors cannot be handled effectively with solutions. In such units, hand cleaning must be adopted. When cleaning manually, extreme care is needed to prevent scratching the cylinder walls and valves with cleaning tools. Under no circumstances should gasoline, kerosene, naphtha or any other flammable substance be used to soften the carbon. Danger of formation of explosive mixtures prohibits use of any materials of this nature. Regardless of cleaning method used, strict regularity must be observed. Periods between cleaning are determined to some extent by cleanliness of the intake air.

Use Clean Air

If at all possible, *intake air* should be drawn from a clean, cool region. Use of an intake-air filter is generally recommended because it reduces cleaning and maintenance time. Another reason that is just as important is the protection of the compressor cylinder resulting from the filters' use. Many types of undesirable matter may be drawn into compressor cylinders that are not protected by filters. Dust, soot, insects and lint are common offenders in food plants. The amount of air contamination depends on plant location and intake pipe height.

The air-intake line should be 8 to 10 ft. above the ground level. Short, straight lines without turns or pockets reduce friction losses and prevent moisture accumulation. If pockets in the intake pipe cannot be avoided, install suitable drains and use them daily. Moisture causes increased corrosion. Clean, cool, moisture-free air keeps down inlet-valve wear and helps maintain low air-cylinder temperatures.

Cylinder-wall temperatures must be below the oil vaporization point at all times. Vaporization and decomposition of the cylinder lubricating oil decrease with temperature. Suitable air-cylinder temperatures can be obtained by providing clean, cool air at the cylinder intake, by operating the compressor at its rated speed, and by circulating a sufficient quantity of cooling water.

The amount of *cooling-water* needed depends on inlet-water temperature, cylinder discharge pressure, and compressor load. As compressor load and inlet-water temperature rise, quantity of cooling water required also becomes larger. Cool water from a dependable source is essential.

Sight glasses or open discharges provide visible means of checking water flow from the air cylinder, inter- and after-cooler. Continuous flow of water prevents overheating and reduces jacket scale deposits.

Scale in cylinder jackets reduces heat transfer to the cooling water. As a result, overheating of the cylinder may occur. Scale can be removed from jacket walls by filling the jacket with a hot solution of caustic soda. Sufficient time should elapse to permit removal of the scale before draining the jacket. Application of scale-removal compound once a year is usually sufficient for proper operation of compressors in food plants. Clean jackets prevent excessive air temperatures in compressor discharge piping.

Air discharge pipes should be at least equal in size to the diameter of the opening in the air cylinder and should run full size to the receiver. Vertical loops, bends and pockets in the pipe, that might provide a place for moisture accumulation, should be avoided.

Provision for *expansion and contraction of the piping* is necessary to reduce stresses in the line. To avoid pulsations and vibration of the piping during periods of load changes, well anchored hangers are needed. Locate piping at a height that permits free discharge of the safety devices in the

(*Turn to page* 146)

TABLE—OIL-FEED RATES for Reciprocating Compressor Air Cylinders

Cylinder Dia. in. Up to 6	Piston Displacement Per Cylinder, CFM Up to 65	Swept Surface Per Cylinder, Sq. Ft. Per Min. Up to 500	Oil Feed Per Cylinder	
			Drops Per Min.	% Pt. Per 10 Hr.*
			0.67	0.05
6-8	65-125	500-750	1.00	0.075
8-10	125-225	750-1100	1.33	0.10
10-12	225-350	1100-1500	1-2	0.112
12-15	350-600	1500-2000	2-3	0.188
15-18	600-1000	2000-2600	3-4	0.262
18-24	1000-1800	2600-3600	4-5	0.338
24-30	1800-3000	3600-4800	5-6	0.412
30-36	3000-4500	4800-6000	6-8	0.525
36-42	4500-6500	6000-7500	8-10	0.675
42-48	6500-9000	7500-9000	10-12	0.825

* Figures are based on 8,000 drops per pint at 75 deg. F.

Trees go on belt

FIRST, girl secures plastic trees to a double row of metal clamps, fastened to a 12-ft. long canvas-belt conveyor.

And olives go on trees

THEN, six girls on each side of the belt affix olives to prongs. Loaded trees are slipped quickly into jars.

Olive-Packing Mechanized

By conveying plastic trees past packers, production is one-third greater than conventional place-packing technic, and in half the floor space

ADOPTION of a novel plastic tree in combination with a conveyor has enabled First National Stores, Inc., of Somerville, Mass., to boost its olive-packing output one-third. And at the same time, floor space previously needed for place-packing olives into jars has been almost halved.

On a moving line (photos above), olives go on branches of the trees, then the loaded trees go into jars—to make especially attractive packs that offer new convenience for the housewife.

Formerly, a highly skilled girl having many months of training could only place-pack 40 to 60 jars of stuffed olives per hour. But now, by using the new system, an unskilled girl can pack 90 jars of 24 stuffed olives per hour.

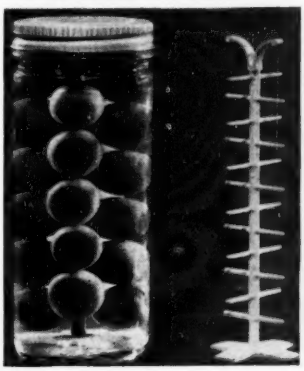
With careful pre-inspection of the olives and greater experience on the part of the packers, this firm believes each girl will soon turn out 120 jars per hour.

How It's Done

Employed is an 18-in. wide by 12-ft. long canvas-belt conveyor that carries two rows of the plastic trees past twelve girls who affix olives to them. At the head of the conveyor, one girl secures trees to a double row of metal clamps permanently fastened to the conveyor belt and spaced 8 in. apart.

As the trees come by, the girls begin to pack. Taking two olives out of the wooden trough in front of her (one olive with each hand), the first girl places them on the two lowest branches of the tree. She repeats with two more olives, then is ready for the next tree coming along on the belt.

New Pack and Insert



Each of the other five girls adds four olives in this manner until each tree holds 24.

At the end of the conveyor, a girl inserts the olive-filled trees into jars. The jars are then washed and brine is introduced into them. Finally, the jars are capped, labeled, and packed into shipping cases.

Special Prongs For Green Olives

Constructed of polystyrene, the tree (see photo) consists of a broad base, a solid vertical trunk, and a series of horizontal prongs to hold individual olives. For green olives, special trees are available, with the end of each prong molded upward at a 45-deg. angle to miss the pit.

Called the Servease Pack, the entire tree of olives can be lifted out of its jar by the housewife and placed on a serving dish. Thus, the new pack eliminates the former difficult job of fishing the olives out of the jar with fingers or a fork. And damage to olives is eliminated. Moreover, a partially used tree of olives is readily replaced in its jar of brine and put away for later serving.

The plastic trees were developed by Packease-Servease Corp., of New York City.

How to Do It

You can get extra profit from your work simplification efforts if you stress the simplification—working to cut lost time by training employees to be . . .

1. **More method-minded**
2. **More motion conscious**
3. **More cooperative**

Broad values will thus be gained in smoothing operations—as pointedly demonstrated by the Bowman benefits pictured here →

NEWLY-AWARE workers realized gaskets needed "corraling"—came up with this carry-tray made from shipping box. Eight sizes are classified on pegs and coffee can.

Simplified Work Simplification

Through special training, Bowman Dairy workers develop sharp eye for spotting all forms of wasted actions—then devise ingenious and economical ways to eliminate them

Ray A. Baer
Bowman Dairy Co., Chicago

Work simplification training was begun in the Bowman Dairy Co. nearly three years ago. Since then, 20 hr. of special training have been received by department heads, processing-plant managers, their assistants, and foremen or correspondingly responsible people.

In all, more than 100 men have been involved—in the departments handling milk and ice cream, in the general office, the laboratory, and the shops.

The program has been conducted by two regular employees initially trained under the direct guidance of Allan H. Mogensen, founder and 'father' of this approach to more effective use of interest, ability, and aptitudes through development of an awareness of waste time and motion in all its forms.

Those trained were quick to respond in making use of the new tool. It became readily apparent that here was a technic suited to an operation that stimulated personnel to look for new methods and new approaches to higher productivity.

■ **Work simplification, as advanced by Mr. Mogensen and as Bowman sees it, is more than the mechanics of charting the sequence of steps in jobs or analyzing the motion pictures of them. It is, specifically, a philosophy which gains mutual benefit from the participation of everyone—especially after participants have been aided by training in developing method-mindedness, motion consciousness, and awareness of the necessity for cooperative effort.**

Improves Supervision, Too

Once the philosophy of work simplification is understood and accepted it becomes something tangible—it becomes the finest kind of supervisory development activity. Too frequently supervisory training programs, as such, leave the supervisor in perfect agreement with the principles but too absorbed with the minute-by-minute problems of his job to apply them.

Along with these same principles, work simplification furnishes means for application, and from that application these principles become the new habit—better supervision.

Good supervision and work simplication must always be found side by side, complementing each other. Both are concerned with getting the best efforts from the worker. Too, each has the responsibility of the other's welfare—supervision to improve productivity and work simplification to make the job an easier and better one for the individuals.

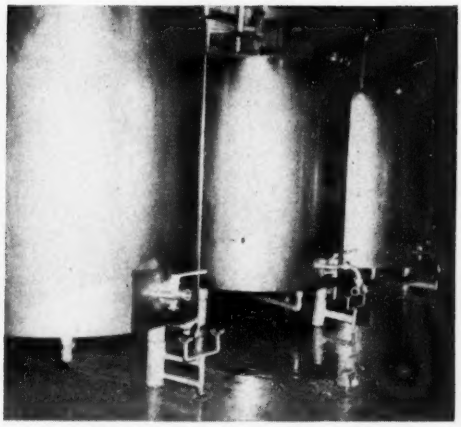
The direct benefits credited to work simplification are legion, and we have had our share. Much publicity has been afforded these benefits in publications of all types. Not too much, however, has been publicly said about related windfalls, which true to the philosophy of work simplification, obtain to management, supervision, and to the fellow doing the job.

Organize a Crew

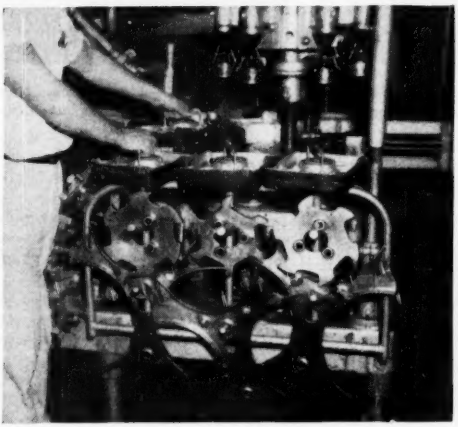
One of these is typified by an activity in a Bowman plant—something that would hardly have resulted without an overall continuing work simplification effort. This plant has organized a self-sufficient group designated the Plant Operating Research Team. It is made up of all the plant supervisory personnel, divided into day and night shift elements. The captain of this group was given prior additional work simplification training directly under Mr. Mogensen. While this is a comparatively new activity it has emphatically demonstrated its effectiveness.

(*Turn to page* 119)

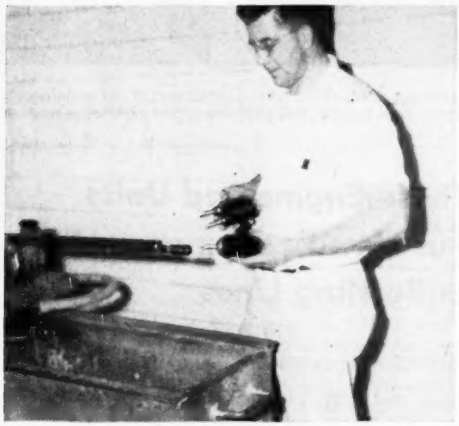
FENCE WITH GATE was put inside bin to hold trash. It simplifies emptying of cans, and bin-door is not obstructed.



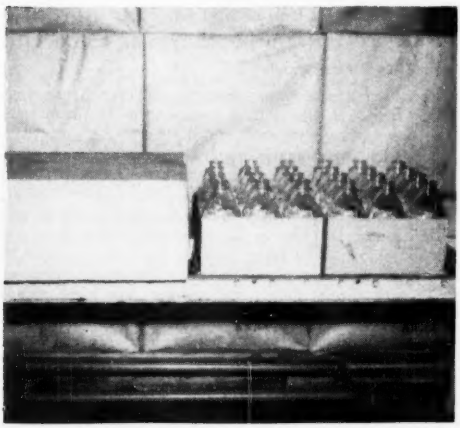
HANDY PIPELINE supports are attached to vat legs. They can be swung under vats when not in use.



PARTS RACK is affixed to machine on which parts are used. It cuts costly idling time during changeovers.

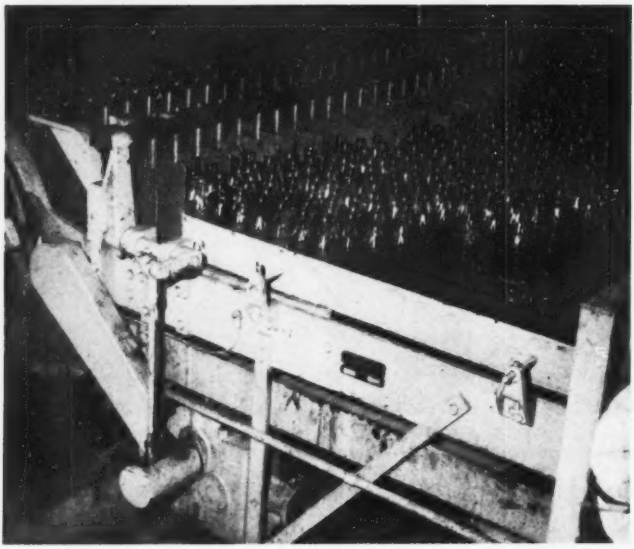


BRUSHES for pipeline cleaning are quickly changed, using special slotted shaft fitting held by spring slip-ring.

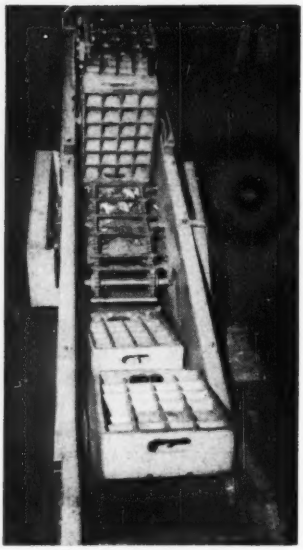


DAIRY specifies cartons minus flaps and part of sides—to speed job of unpacking new bottles.

GLASS TUBE and rubber air bulb make for safe transfer of concentrated sulfuric acid to burette, as needed.



NUMBER ONE—Feed tables, comprised of flat stainless-steel chains that move bottles into washer, and separators that distribute them uniformly over chain.



NUMBER TWO—Case cleaners that invert empties and dump out trash.

These Engineered Units Put New Performance In Bottling Lines

Southern operator's special soaker-washer feed and empty-case cleaner cut labor requirements and boost production

E. DALTON WHITE
"Food Engineering" Special Correspondent, Atlanta, Ga.

Increased efficiency and lower maintenance expense have been gained at the Atlanta Coca-Cola Bottling Co., Atlanta, Ga., by installation on the lines of two pieces of specially engineered equipment.

First, a new type table for feeding empty bottles to soaker-washers, developed by O. O. Clack, operating and maintenance engineer, and built by Standard-Knapp Div. of Hartford-Empire Co., Portland, Conn., has enabled one worker to unload up to 15 cases per minute. And second, a turnover device has simplified case cleaning.

The feed table consists of a series of flat-bed stainless-steel chains mounted on a frame in such a manner as to keep the chains lying flush and level. They move simultaneously, being pulled toward the washer by a motor-driven continuous shaft. The entire operation is fully automatic and the unit is adjustable to any desired speed.

The smooth movement of bottles on this device has practically eliminated chipping of their bottoms. Moreover, this improvement has brought better operations on other line equipment. For the fewer the bottles with chipped bottoms, the less chance there is of tip-overs as they move along to fillers and crowners.

Magazine maintenance has been reduced, since this table-chain is lubricated, thereby eliminating most of the abrasion caused when bits of foreign matter were caught up in the dry chain previously used.

Efficiency of the soaker has been increased because the bottles feed uniformly and the attendant has sufficient time to remove any broken and uncapped bottles, straws, and other trash.

Another feature: Attached to the new feed are a series of cam-operated fins (see left photo) that distribute the incoming bottles uniformly across the chain-table and align them with the bottle-pockets of the washer. Action of these aligning fins has greatly reduced the abrasive action of bottles against one another as they move into position. What's more, they have enabled one operator with a 12-bottle gripper to unload up to 15 cases per minute.

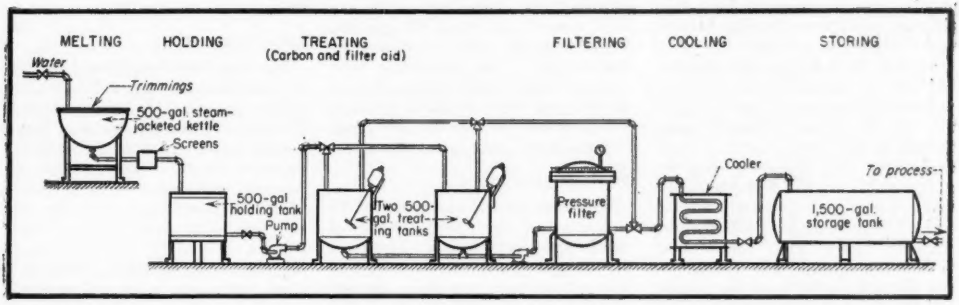
Cases Cleaned Automatically

Removing straws, paper, crowns, and other trash, from empty cases has been a time-consuming chore requiring at least one employee on each bottling line. As a means of making this an automatic operation, a case-turnover device was designed and installed in cooperation with the Logan Co., Louisville, Ky.

The device consists of a chain conveyor powered by a ½-hp. motor that drives all belts and chains through a friction clutch. The latter protects the motor in case the conveyor jams on a defective case. The roller chains are fitted with special flights and spacers (see right photo). Entire unit is enclosed, with removable panels.

In operation, empty cases coming from the washer-feed drop off the roller conveyor and are turned over onto the chain conveyor. The drop provides sufficient jarring action to loosen all trash and dump it onto a deflector, from which it slides into receptacles located on each side. Cases are then reversed, right side up, onto the belt conveyor that starts them on the way to the automatic case packers.

Steps Detailed—From Melting to Storing



GROUND trimmings are first melted and neutralized in steam-jacketed kettle. Syrup is then gravity-fed through screens into stainless steel holding tank. From here, syrup is pumped to treating tanks, where activated carbon and filter aid are added. Finally, syrup-slurry goes through pressure filter and cooler, then is fed into storage tank.

Pure Syrup From Candy Trims

Here are most feasible and favorable ways of making confectioners' quality product from remainders . . . Novel Kroger method is included

RECLAIMING of candy trimmings in the form of a top-quality re-usable syrup calls first for extreme care in selecting the method best suited for your own specific operation—for a system that proves satisfactory for one plant may leave much to be desired in another.

And having made your choice of method, the second step is attainment of adequate control and supervision to assure optimum performance.

In the following article, two outstanding candy specialists describe procedures and precautions that are pertinent in reclaiming trimmings. Specific methods detailed relate to the recovery of syrup in the manufacture of hard candies, starch-containing goods, marshmallows, chocolate items, and glace fruits.

Analyzes Recovery Technics

W. H. CHILDS

Research Division, Armour and Company, Chicago

From properly processed candy trimmings, a syrup can be obtained which can be re-used in different types of confections. This syrup can be chemically controlled so that it has little color or flavor and its composition is uniform. It can be used in a variety of ways. Candies made with reasonable amounts of this reclaimed syrup have better color, taste, and keeping qualities as compared with those containing trimmings that have been directly reworked into them.

In general, the re-working of candy trimmings is not good practice. The introduction of trimmings into new batches reduces the output of the plant. Furthermore, it complicates quality control measures. Orange flavored trimmings would have to be utilized in orange batches, and peppermint trimmings in peppermint-candy batches. This kind of practice is too restrictive —old-fashioned.

Many candies contain fruit acid, citric or tartaric, to bring out the fruit flavor. And when a high acid content candy is re-cooked, the invert gets out of control. To prevent this during the reclaiming process, it is necessary to "kill" the acid. For this purpose, precipitated chalk is best. The calcium citrate or calcium tartrate which is formed may be considered sufficiently insoluble to eliminate appreciable inversion. In other words, the composition of the syrup on a solids basis will be very nearly that of the candy trimmings.

Candy trimmings containing starch, gum drop pieces, tailings, and panned items are difficult to filter unless the starch is solubilized. This may be accomplished by enzyme or acid action. The enzyme treatment has little effect upon the composition of the candy trimmings, except a breaking down of the starches. Sugars are unaffected. After enzyme treatment, starch-containing candy trimmings undergo the same general treatment as other trimmings.

Considerable complaint has been made that syrups reclaimed from candy trimmings are not light enough in color to be used in fondants. True, many syrups have a straw color, which preclude their use in fondants. However, some of these straw-colored syrups may be subjected to more carbon treatment and the color further reduced. Since many syrups are of rather low density—say 50 to 60 percent solids content—the use of 10 to 25 percent of this syrup (making necessary adjustments in the formula) should not have any appreciable effect on the color. Certainly, for fondants used to grain fudge batches, the reclaimed syrup should prove satisfactory.

Recovering Hard-Candy Trimmings

Here are the steps to follow in recovering hard candy trimmings: Grind the trimmings in a hammer mill (a melangeur also does a good job).

Some plants separate the trimmings according to flavor or color. There may be some advantage in doing this, although perhaps not enough to warrant the expense involved.

Add 500 lb. of the ground trimmings and 300 lb. of water into a steam-jacketed kettle equipped with an agitator. Introduce enough chalk to bring the pH to 6.0. The amount of chalk needed will vary, depending upon the acidity of the candy. About 2¾ lb. is required if the average citric acid content of the trimmings is 0.75 percent. An advantage of using mixed candy is that the mixture will presumably run about the same from day to day, and thus control is simplified.

Steam is turned on and the candy trimmings are dissolved. The batch is heated at 180 to 220 deg. F., and a slurry of about 10 lb. of carbon and perhaps 4 lb. of filter-aid solution is added. Agitation is continued for 20 to 30 min. after the addition of the carbon slurry.

After the syrup is filtered, it is adjusted to a pH of 6.0 by the addition of a little soda or acid. Then the syrup is immediately cooled.

With some kinds of candy, less carbon may be used. For example, lemon trimmings will be easier to decolorize than, say, raspberry or grape. Certain red and green colored candies may be difficult to decolorize. Mixing of candy trimmings assists in securing a reasonably uniformly straw-colored reclaimed syrup.

Likewise, the amount of filter aid may have to be varied. Although it may be good practice to pre-coat a filter, more often it is the rule to bypass the first few gallons back to the kettle until the syrup becomes clear. Suppliers of carbon are equipped with laboratories, and they are able to advise confectioners on the type of carbon best suited for the kind of trimmings to be reclaimed. This also goes for the filter-aid suppliers.

Syrup that is reclaimed from hard candy trimmings according to the above-outlined procedure will have a solid content of about 60 percent. Experimentation will show whether this is more or less satisfactory than making a more dilute syrup. It appears to be more desirable to work toward getting a high density syrup if the decolorization is satisfactory.

Unique Recovery Systems

A set-up successfully used in the reclaiming of hard candy trimmings at one plant employs a separate room for the process. This room is constructed of tight partitions so that there is no seepage of fine carbon dust.

The ground candy is brought into this room by trucks. It is then weighed and dumped into a steam-jacketed copper kettle. Two kettles and one filter are used to recover batches almost continuously. One kettle is filled and the treatment is started while the second batch in the other kettle is filtered. A Pyrex pipeline from the filter enables the operator to judge the clarity and color of the filtrate.

The filtered syrup is pumped to a holding tank in a cooler, then delivered to the cooking floor. It takes about 75 min. to reclaim each batch of trimmings. The filter press is cleaned only twice a day, the room being given a good hosing at the end of the day.

Another plant's set-up operates as follows: From the kettles used to dissolve, heat, and treat the trimmings, the treated candy solution containing the activated carbon is gravity-fed to a tank, from which it is pumped by air pressure to the filters. With this arrangement, mechanical pumps are eliminated, since the air pressures are accurately controlled.

Now let us consider the handling of trimmings containing starch. Starch must be treated with a diastatic enzyme or acids like hydrochlorie or sulfuric so that it will not clog the filter.

Special Treatment

The operation may proceed by taking the following steps: Dissolve the trimmings to produce a syrup of about 25 to 30 percent solids content. Keeping the syrup at 140 deg. F., add the estimated amount of enzyme, then agitate until tests show the desired results. It is not necessary to continue the starch-digestion process until a negative iodine test is given—a decrease in the viscosity of the syrup, sufficient to enable filtration, is all that is necessary.

Proper viscosity can easily be determined by taking the same filter medium used for the plant filter press and employing it in a Buchner funnel and a suction flask. As a matter of fact, this simple laboratory set-up can be used to pre-determine the amount of enzyme actually needed before the larger plant-size run is made.

After attaining the proper reduction in viscosity, the batch should be treated in much the same manner as hard candy trimmings. Add about ½ to 1 percent by weight of carbon based on solids, then agitate, heat to 180 deg. F., and hold at this temperature for 30 min. Next add the filter aid, filter, and cool at once.

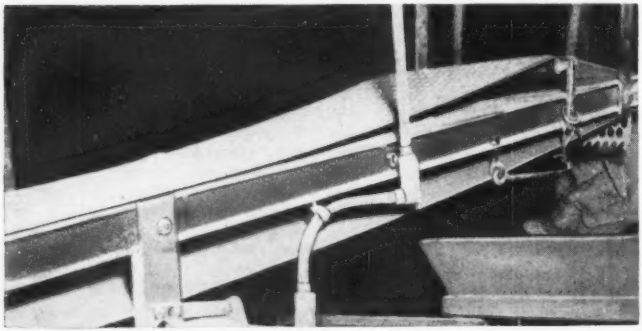
We now come to recovery of trimmings in the gum drop and marshmallow group: Trimmings here do not have high salvage value because of the low cost of the ingredients. It is easy to reclaim these items by merely reheating and reintroducing the resultant syrup or semi-plastic product (without further refining) into darker-colored gum batches. In this case, sorting is necessary, since flavors and colors are not removed.

The practice just outlined is mentioned as an "out" for those who may get discouraged by the procedure necessary to "dissolve" the starch.

Process for Chocolates

Chocolate candy trimmings are much more difficult to reclaim than other types. Since the ingredient cost of chocolate is quite high, it becomes very important to salvage it. The age-old method of re-using is to manufacture a kindred line of candy in which the chocolate trimmings may be utilized. Fudge or caramels always furnish a possible outlet.

Trimmings containing chocolate and fats are sometimes melted in water to give a solids content of about 50 percent. This mixture of water and chocolate is left overnight at about 90 deg. F. On the next day, the scum is skimmed off. (Incidentally, skimming off all batches of trimmings is



SIMPLEST way to reclaim sheet-stamped trimmings when die-cutting (as with sugar wafers) is to convey material right back to the sheeter.

advisable; thus paper-wrapping bits are also economically removed.) The resulting liquid is then treated with carbon and filter aid.

One manufacturer mixes some chocolate trimmings with other candy scrap and, without changing the reclaiming procedure, treats the subsequent batch with carbon, and filters it. The chocolate and fats are removed by filtration.

In both practices mentioned above, however, the chocolate is lost.

The use of activated carbon is sometimes accompanied by a phenonomen known as peptization, in which the carbon seems to form a complex which cannot be filtered. Peptization during the treatment of candy trimmings is not common, although it has occurred often with related products such as honey. The carbon suppliers have issued pertinent suggestions so that little difficulty now arises in using carbons.

The re-use of syrups left over in the preparation of glace fruits is possible through employment of activated carbons. Artificially colored maraschino cherry syrups have been successfully decolorized and rendered suitable for re-use in candies and other food products.

It may be of interest to mention that the ion-exchange resin treatment shows promise in producing light colored syrups. When run through ion-exchange systems, the syrups must be diluted to 30 or 40 deg. Brix. And if a clear syrup is required, filtration and/or treatment with carbon may be necessary. To my knowledge, no installations of ion-exchange resin systems have been made in candy plants for this purpose.

Kroger Reclaiming Process

Here are the directive details of a novel candy - trimming reclaiming process developed by the Kroger Co., Cincinnati:

1. Add 3,700 lb. of assorted gum trimmings (containing no appreciable quantities of coconut, chocolate-coated centers, or marshmallow) to 450 gal. of water in a 1,000-gal. tank with steam coil, and agitate constantly. This tank is lined with Lastiglas, a corrosion-resistant plastic coating produced by Bisphoric Products Co., Cincinnati.

2. Heat trimmings at 185 deg. F. until they are completely dissolved. Then raise temperature to 190 deg. F.

3. Introduce 35 to 40 lb. of C.P. concentrated sulfuric acid at rate of 4 lb. per min. to obtain a pH of 2.0 or 1.5. Hold this solution at 190 deg. F. for 25 min.

4. Determine end-point (a Burgundy color) of conversion by means of a 3 percent iodine solution. When test shows complete conversion, immediately neutralize with 40 to 45 lb. of calcium carbonate, and then adjust pH to 5.1 or 5.3.

5. Cool solution to 140-145 deg. F., then add 48 lb. of activated carbon, previously wetted with water.

6. Fill a 270-gal. pre-coat tank to about 90 percent of its capacity with solution from Lastiglas tank, and add 30 lb. of filter aid with constant agitation. Then to remainder of syrup in Lastiglas tank, add an additional 75 lb. of filter aid.

7. Circulate (with constant agitation) the liquid from pre-coat tank through a 330-gal. capacity filter and back again to tank until solution is clear. Then divert clear syrup into a 1,000-gal. steam-jacketed stainless steel tank. Meanwhile, adjust flow of solution from Lastiglas tank through filter into stainless steel tank.

8. Blow any liquid remaining in the filter into stainless steel tank by means of air.

9. Add 3,700 lb. of assorted hard candy trimmings to filtrate in stainless steel tank and completely dissolve them by constant agitation.

10. Introduce 189 lb. of water-wetted activated carbon to candy trimming solution.

11. Adjust pH of solution to 4.8, and hold it for 30 to 40 min. at 140 to 145 deg. F.

12. Wash filter and fill pre-coat tank to about 90 percent of its capacity with concentrated syrup from stainless steel tank. Add 30 lb. of filter aid with constant agitation. Circulate (under constant agitation) contents of pre-coat tank through filter to stainless steel tank until samples taken in fruit jars at 5-min. intervals are consistently clear.

13. Add 15 lb. of filter aid to contents of stainless steel tank. Divert flow, which is clear, to steel drums or other containers. Submit samples from each drum or container to control laboratory.

14. Blow liquid remaining in filter by air into Lastiglas tank, when pre-coat and stainless steel tanks are emptied. Clean filter.

Spotlights 3 Major Steps

V. R. CICCONE

Assistant Works Manager, The Charms Co., Bloomfield, N. J.

Candy trimmings represent a waste of labor and materials, and regardless of what methods are suggested for their re-use, it is best to make a thorough study of them. Each processing step should be investigated so that measures can be taken to keep the amount of candy trimmings as low as possible.

To prevent further losses, the trimmings should be kept clean and stored properly. To keep down sorting, handling, and processing costs, the trimmings should be segregated at their source.

Hard candy rejects may be classified as corn syrup, all sugar, solid, filled, acid, non-acid, wrapped, and unwrapped goods, as well as siftings.

Solid trimmings, if clean and separated on the basis of color and flavor, can be re-used by incorporating 5 to 6 percent of them in a new batch on the cooling slab at the same time color and flavor are added.

If the pieces are large, it may be necessary to pre-grind solid trimmings before adding them to a new batch. This is necessary to permit the heat of the batch to thoroughly melt the pieces.

Care should be exercised in not incorporating candy which has been grained—for a grained candy may act as a seed and crystallize the entire batch.

Although the above procedure for re-use of solid goods, is most economical (since it results in complete recovery of candy base, flavoring, color and acid), it would only be practical for part of the trimmings.

The balance of the reclaimed product can be used for centers with fruit pulp, jellies, invert sugar syrups, and for blending with sugar syrup to be used in making other hard candies.

Production of a general-use scrap syrup that is free of color, flavor, and odor, neutral in pH, low in reducing sugars, and good in keeping quality, can be attained by careful control during these three processing steps: (1) Preparing the trimmings for treatment, (2) melting and neutralizing them, and (3) removing impurities.

1. Preparing the Scrap

Trimmings segregated into the previously mentioned categories will eliminate guess work and result in better and more uniform syrups. The trimmings should be ground fairly fine so that they can be quickly dissolved in a kettle at as low a temperature as possible. High melting temperatures will form additional color and excessive inversion.

The water should be carefully measured to obtain a syrup of the desired solids. The trimmings should

be weighed and the acid content recorded.

2. Melting and Neutralizing

Due to the action of acids on iron, trimmings should be dissolved in stainless steel units. Unless it is desired to produce an inverted syrup, a neutralizer should be added as acid-containing trimmings are put in the water. In this manner, acids can be neutralized as they dissolve, thus resulting in much less additional inversion than would be obtained by dissolving the entire batch and then adding the base.

Sodium bicarbonate or sodium carbonate can be used as neutralizers, but they produce soluble sodium citrate or tartrate which remain in the syrup. If the acids are neutralized with calcium carbonate, the insoluble calcium salt produced can be removed by filtration. The amount of base needed is calculated from the weight of the trimmings or their acidity, the latter determined by titration.

To neutralize 1 lb. of hydrous citric acid, add 19.18 oz. of sodium bicarbonate, or 12.49 oz. of sodium carbonate, or 11.42 oz. of calcium carbonate. Also, each pound of tartaric acid can be neutralized by 10.6 oz. of calcium carbonate, or 17.9 oz. of sodium bicarbonate, or 11.13 oz. of sodium carbonate. Finally, the finished syrup is adjusted to the desired pH after filtration.

3. Removing Impurities

When treating hard candy-scrap syrups with carbon made by chemical treatment, we found that the dosage required to produce like results was 40 to 50 percent less. This reduction in carbon usage might be taken into consideration to increase the capacity of the filter press.

The amount of carbon needed depends upon the quantity of impurities, and it can easily be determined by treating a small sample of syrup with ½, 1, and 1½ percent carbon (calculated on the solids content of the syrup), agitating, and filtering. In this way, we can determine the approximate amount of activated carbon needed.

If this test indicates a range between ½ and 1 percent, re-test with 0.7 and 0.9 percent of carbon. The carbon required for a batch should be pre-mixed in a small quantity of syrup, and then added in the form of a slurry to obtain quicker mixing and to eliminate dusting.

The temperature at which the carbon-treatment is carried out is dependent on the material. For instance, scrap syrups containing invert sugar or corn syrup tend to darken with heat. Therefore, the treatment should be conducted at as low a temperature as possible. Time is required to reach absorption equilibrium. And longer contact between carbon and syrup will compensate for the lower temperatures.

It is recommended that the syrup density be as low as possible, since the accompanying reduction of viscosity aids the penetration of the liquid into the small capillary structure of the carbon, resulting in faster absorption. Treating scrap syrups at low density is practical, provided the syrup is to be immediately used in a batch where additional water is normally required. Or the solids content of the syrup can be increased in an evaporator to a point where it is safe against fermentation.

Adding Carbon and Filter Aid

The carbon-treating tank should be provided with proper agitators which will cause a turbulent motion of the liquid and allow the carbon particle to mix with syrup liquid thoroughly.

After decoloring the scrap syrup, filter aid is added, and the batch is pumped through a filter press. If the syrup contains colloidal material from filled goods, larger amounts of filter aid are needed to keep the filter cake porous.

The pressure at which the filtration is started should be carefully watched, because excessive pressures at the start will tend to compress the filter cake and result in low filtration rates. And subsequent increases in pressure will only aggravate this condition.

Scrap syrup should be circulated from treating tank through filter press and then back to the same tank until a clear syrup—free of carbon particles—is delivered. Then, the clear syrup is delivered to storage vats. If possible, cool the syrup to room temperature before pumping it to storage tanks. Cooling arrests the formation of color, particularly from corn syrup and levulose.

Checking Final Syrup

Treated scrap syrup in storage vats should now be checked for pH, for reducing-sugar content, and for total solids. This information is necessary for determining amount of treated scrap that can be incorporated in the various candy items that are to be manufactured.

Storage tanks and equipment used for processing scrap syrup should be thoroughly cleaned to guard against fermentation. And separate lines should be used for pumping the scrap syrup to prevent mixing with other syrups.

Consideration should also be given to the use of ultraviolet lamps in storage tanks, especially if hot syrups are pumped into them. On cooling, a condensate forms on the surface of the syrup, thus reducing the Brix (or sugar content) and making it possible for fermentation.

The method for reclaiming trimmings can be modified to suit specific needs. In some instances, use of bleaching agents may be indicated. The adoption of the ion exchange process may be possible, however we have not been able to justify using it for treating hard candy scrap to recover syrup.

The above article is based on papers which were presented by the authors before the recent Bethlehem, Pa., meeting of the Pennsylvania Manufacturing Confectioners' Assn.

—End—

Non-Stop Liquid Blending

—Continued from page 59

to the secondary flow pen, thereby increasing the controlled air to the diaphragm valve until it has closed enough to bring the secondary flow rate back to the desired value.

Benefits Are Many

Major reason for installing the new system was to speed operations and eliminate the full-time, tedious job of batch blending. So the consistently improved blend and much closer control of alcohol content resulting from the installation were unexpected advantages.

In addition, it was soon noted that the set-up required practically no maintenance. Its mechanical components were set up for long and hard service—the instruments were types which had been developed for outdoor operation in the petroleum country.

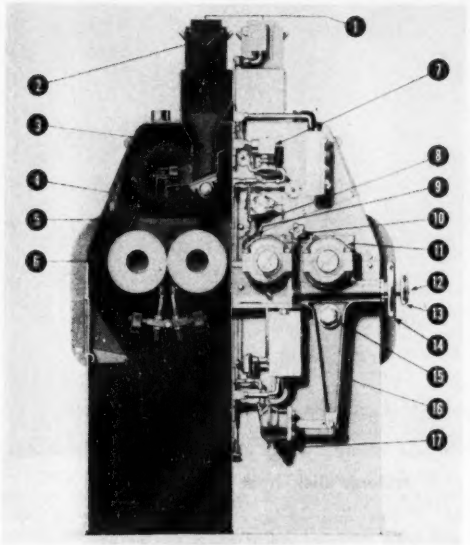
And the new line-flow sanitation afforded a vast improvement over the daily chore of batch-tank cleaning. All fluid handling equipment, including the stainless steel bellows of the flow meter, is given a caustic solution flush once a week.

In fact, everything worked out so well that the company will soon install a companion system to take care of other blending jobs in the plant. This new set-up will be used to blend even relatively small quantities of beer, and at varying ratios.

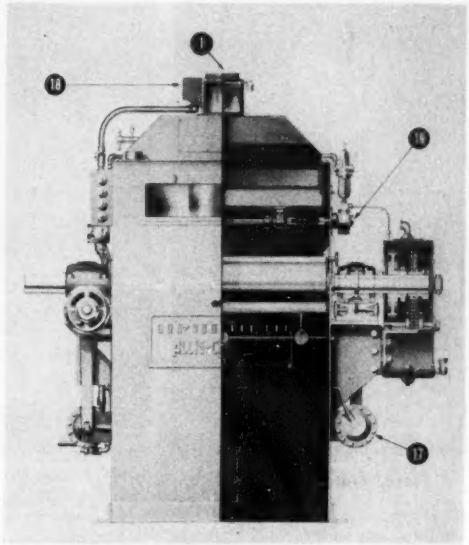
It appears that confidence in the ability of the first system—which is used under almost fixed conditions—has set the stage for this type of control to really prove its mettle in brewing.

End (*Resume reading on p. 60*)

NEW EQUIPMENT & SUPPLIES



CUTAWAY VIEWS: Side . . .



. . . and front

Better Feeding, Uniform Pressure With New Roller Mill

Two important needs—improved feed distribution and even pressure at the ends of the rolls—were recognize in designing this advanced roller mill.

Unless a mill's roll feeders are carefully adjusted, feed distribution is irregular, resulting in uneven wear on the roll faces. And the use of springs and other mechanical control does not always obtain uniform pressure at both ends of the rolls.

A high speed vibrating type feeder (photos) was developed, giving even stock distribution from one end of the roll to the other. Use of an air motor on these feeders provides flexibility in speed and permits accurate feed regulation.

Rolls are set the same at both ends by means of adjustable, calibrated handwheels. And air pressure—from a single source—provides a positive means of maintaining this same pressure at both ends. In addition, the mill has stops to prevent the rolls from coming in contact with one another.

Feeder and rolls are interlocked on this modern mill, so that rolls open automatically when the feed is stopped.

Sanitation is stressed in the construction with corners rounded and ledges and pockets eliminated. New mill has a welded steel frame with removable front for inspection and maintenance. Top of frame is fitted with four round openings for air suction. Hopper and feeder adjustment doors have Plexiglas windows. Convenient product-sampling door is located below each set of rolls in this mill.

Known as the "Air-Set", it features a design aimed to improve and to standardize milling practice through basic roller-mill elements. The new unit is stated to provide the closest approach to automatic milling yet devised.

In side and end view illustrations (above) the various components of the mill are designated. Here's how the machine works: Before starting, roll gap adjustment is made by jackscrew (12), which adjusts bearing housing (11) in relation to fixed bearing housing (9). Handwheel (14) allows adjustment, while lock handwheel (13) holds adjustment. Roll surfaces are given minimum setting by spacer (10), preventing surfaces from coming to metal-to-metal contact. Adjustment of eccentric nut (15) corrects rolls for tram.

Assuming that there is no stock in feed hopper (3), roll motor is started manually, and after rolls come up to speed, a relay operates a solenoid valve (7) to start feeder motor (19) if stock is flowing through feed spout (1). Flow of feed is detected by mercoid switch (18) actuated by gate (2) when held open by feed flow.

After vibrating pan-type feeder (4) starts, an adjustable delay timer admits air—under pressure—to all four automatic type air diaphragms (17). Diaphragm movement acts through lever (16) on movable bearing housing (11), and brings movable roll (6) to its setting from fixed roll (5). Pressure against diaphragms (or against movable rolls) is held constant by pressure control valve (8).

When roll driving motor is stopped, movable roll backs off and feeder motor automatically stops. If feed is stopped, feeder motor stops and rolls open.—*Allis-Chalmers, Milwaukee* 1.

Circle 83A on Reader Service Card

Sand Blast Cleaner Does All-Around Job

Here, 1-man unit . . .

. . . restores slick floor finish

Safety, convenience and speed in sand blasting operations of various types are reported with use of this new machine.

Offering the unit for all-around use, maker states this equipment may be employed to remove paint, scale and rust, to clean storage tanks, railroad cars and recondition concrete floors (photos). And with use of a separate attachment, it will even double as a bulk materials handling conveyor.

A special principle of operation is credited for eliminating any hazard of silicosis from flying dust and abrasive.

Unit is portable, simple to operate, and is equipped with a light, easy-to-handle nozzle for one-man operation. It consists of uniquely designed blasting gun, an abrasive separator-generator, and a vacuum pump dust collector unit. The pump, driven by a 10-hp. G. E. motor, provides a continuous vacuum of equalized pressure during operation.

Blasting gun consists of a nozzle that is surrounded by a vacuum pick-up cone and is further enclosed at point of surface contact by a brush in a flexible retainer. Brush on gun is held in contact with surface to be cleaned, and air stream to vacuum return line picks up dirt, dust and spent abrasive material.

Gun, is equipped with a pushbutton control operating the automatic starter equipment. Thus, complete control can be maintained by operator at the nozzle.

In operation, surface to be cleaned is bombarded by abrasive from blasting nozzle. Resultant refuse and spent abrasive automatically are returned to abrasive reclaimer for separation. Operation is continuous and no shutdown is necessary to replenish abrasive supplies or empty refuse collectors.

Unit offers a high personnel safety factor in that dust, oversize scale particles, and used abrasive material is carried through hoses to a reclaimer unit some distance from the nozzle. Re-usable material is returned to the blast nozzle through a recharging system.

Dust laden air and spent abrasive "fines" are drawn on through a rubber hose to the dust filter unit.

Companion product, Vacu-Veyor, employs the same vacuum pump and dust-collector equipment as blaster, and is sold either complete or as an attachment, previously mentioned, for owners of blaster units.

Vacu-Veyor is a portable, one-man vacuum conveyor for all types of bulk granular materials. Unit is particularly designed for removing materials such as oats, wheat, barley or shucked corn from elevators or silos. As an example of conveyor's capacity, it can move dry sand at 6,000 lb. per hr.

Operation of conveyor is simple. After unit is started, only attention required is shifting of nozzle in material to insure a continuous supply.

Material is conveyed pneumatically through lengths of 3-in. tubing and hose to a cyclone-type separator-unloader. This unit may be located anywhere up to 100 ft. from nozzle. Material is automatically ejected from the separator-unloader without interrupting pickup operations. Dust from air stream is removed by the same bag-type filter unit used in blaster. —*Vacu-Blast Co., Inc., 350 Peninsular Ave., San Mateo, Calif.*

Circle 84A on Reader Service Card

Temp Control Improved On Laboratory Oven

Uniformity of temperature and improved thermostat response are two of new features of a forced draft laboratory oven just announced.

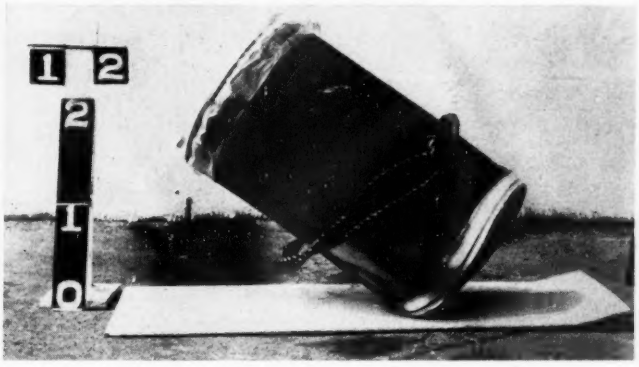
A multi-blade blower wheel and ball bearing motor provide continuous circulation of air inside the heating chamber. A power selector switch that allows instant selection of low, medium or high current input is incorporated.

The unit is constructed of Type 302, 18-8 stainless steel inside and out.—*Schaar and Co., 754 W. Lexington St., Chicago 7.*

Circle 84B on Reader Service Card

Fiber Drum Package Safely Handles 55-Gal. Loads

Components



Drop Test Proves It's Rugged

Non-corrosive, non-flammable liquids in quantities greater than 5 gal. are now successfully shipped in a new fiber drum package of 55-gal. capacity. In the new container, there is a polyethylene envelope, protected at the base by a heavy boot of creped duplex kraft paper.

Its name, the "FPEB" drum package, signifies "Fiber, Plastic Envelope, Boot." Asserted advantages include ability to withstand shipping abuses, a very low tare weight, and the feature that user may open and re-seal it while still protecting the contents.

Components of the new drum package, which is assembled by mandrelling, are shown in illustration at left, above. They include (clockwise) the steel lid and locking ring, the fiber drum, plastic disk, full-ring sponge gasket, polyethylene liner and kraft paper boot.

Photo at right, snapped during a drop test, shows a drum containing 400 lb. of water hitting a steel plate after a 2-ft. fall at a 45-deg. angle. This was the second drop, the point of impact here being 180 deg. from the first one. In spite of badly distorted bottom and damaged sidewall, there was no leakage.

Package consists of a specially constructed 55-gal. fiber drum equipped with a separate polyethylene envelope impervious to and capable of retaining its contents. Pinching, undue stretching, or other damage to plastic envelope, is prevented by boot placed between plastic envelope and drum, and extending upward some 10 or 12 in. from bottom.

Open top of plastic envelope is allowed to overlay top chime of drum. A disk of same or similar plastic material is placed over open end after drum is filled and before lid is positioned. A full-round sponge rubber gasket is cemented to underside of lid, and when drum is closed, this gasket seals plastic disk securely against overlay portion of envelope. Thus, package may be opened and re-sealed repeatedly.

Users must obtain shipping permits from one of the four railroad classification committees for rail shipments, and from the National Classification Board for truck shipments. Suppliers cooperating in the development of this package include: Continental Can Co., Inc., drums; Visking Corp., film; Shellmar Products Corp., Kellogg Container Div. of U. S. Envelope, and Hedwin Corp., for conversion of film into envelopes; and Cincinnati Industries, Inc., boots.

U. S. Patent 2,511,481, owned by Rohm & Haas Co., covers the new drum package. Licenses are reported to be available on a nominal basis to responsible shippers. Elements of drum package are purchased from suppliers, as noted above, and assembled by Rohm & Haas for its own use.—*Rohm & Haas Co., Washington Square, Philadelphia 5.*

Circle 85A on Reader Service Card

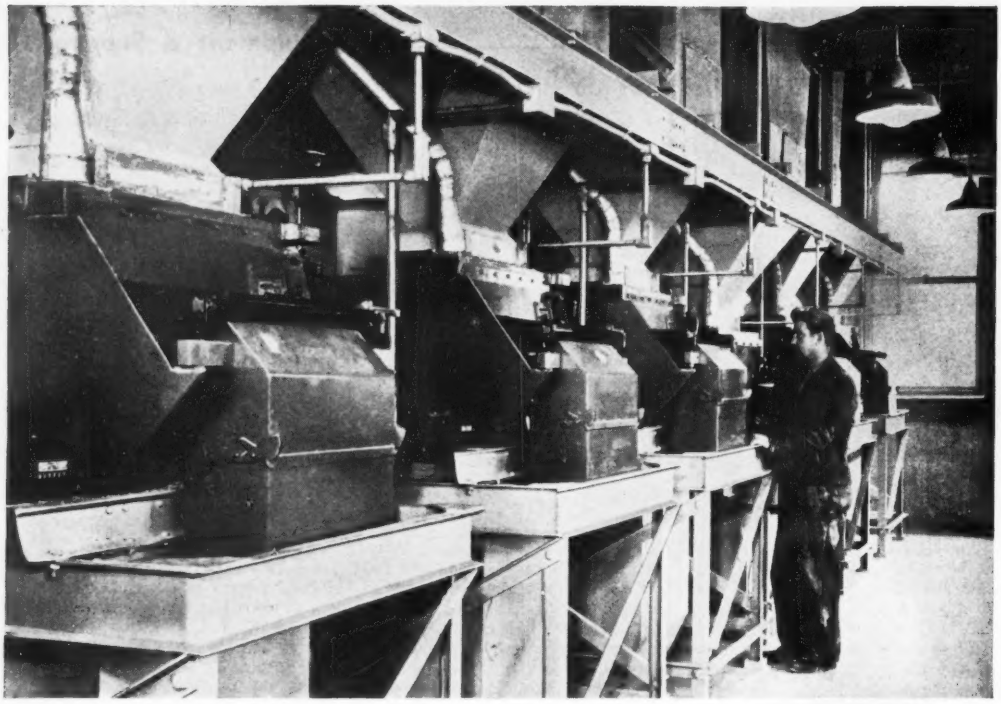
Endless Conveyor Used as "Point of Sale" Medium

Idea for management is the new trend to engineered movement in advertising—for conveyors now move more than food materials.

In this new wrinkle (photo), advertising is belt carried, space being offered in "point of sale" form in super-markets.

Unit is an electrically driven conveyor 14 to 36-in. high and running from 5 to 50-ft. in length. Multicolored vinylite, illuminated photographic panels illustrating various products move along the conveyor on an endless chain system. Panels may be made visible from both sides. Conveyor travels at rate of 3 to 7 ft. per min., giving maximum readability.—*Advertising Conveyors, Empire State Bldg., New York City.*

Circle 85B on Reader Service Card



RICHARDSON AUTOMATIC SCALES WORK FOR NABISCO

A high hourly volume of flour—accurately blended to meet the exacting requirements of National Biscuit Company's huge baking operations—those were the specifications, and Richardson supplied the foundation for success—perfectly blended wheat. A battery of Richardson Automatic Scales accurately keep pace with the speed and volume of Nabisco's tremendous operation.

PROBLEM:

To obtain the greatest possible consistency and accuracy in blending wheat on a high tonnage basis.

SOLUTION:

Installation of a battery of Richardson Automatic Scales—accurate to 1/10 of 1% of all material weighed. Accurate blending of wheat by weight was accomplished for the largest soft wheat milling operation in this country.

Perhaps you have a blending or weighing operation. Are results as accurate and efficient as you would like? Why not call on the backlog of experience of a Richardson engineer. At some time in Richardson's 50 years' experience in materials-handling-by-weight, a problem similar to yours has been met—and effectively solved. A survey of your weighing or blending problem places you under no obligation.

For information on Richardson Automatic Weighing Equipment, ask for Bulletin No. 0450. For information on Richardson Proportioning, Blending, and Process Control Equipment, ask for Bulletin No. 0550.

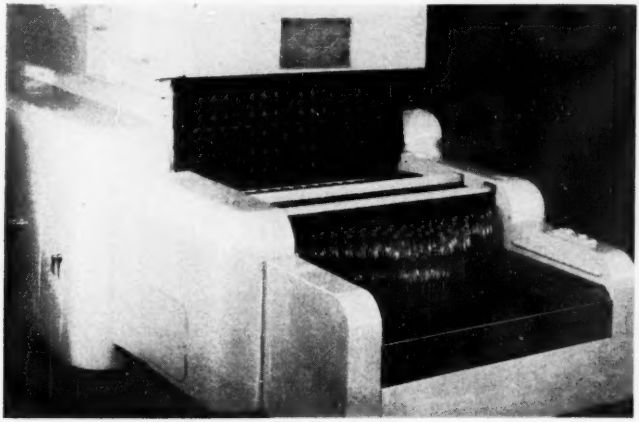
Richardson Scale Co., Clifton, New Jersey. Feeder-Weigher Systems of All Types: Automatic Bulk Weighing Hopper Scales, Including Conveyor-Feed Types—Continuous Feeder-Weighers—Automatic Bagging Scales—Bag-Sewing Conveyors—Packers—Process Control Panels. *Branch offices in:* Atlanta • Boston Detroit • Minneapolis • Cincinnati • Wichita • Montreal • Omaha • New York Pittsburgh • San Francisco • Toronto • Buffalo • Chicago • Philadelphia • & Houston.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

7631

Bottle Washer Feeder Table Readily Installed



Plant personnel can easily install this automatic magazine feeder table.

Featuring labor-saving, unit has been designed for double-end bottle washers, 8-32 bottles wide in split, pint or quart models. Table can be used in conjunction with all automatic case unloaders or hand fed with bottle grippers. Snap-on adaptor plates enable the quarter model to accommodate split and pint size bottles, and in like manner the pint model can process split size bottles.

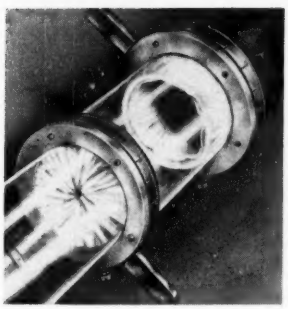
Mechanical highlights include a stainless steel self-lubricating feeder belt, bearings equipped with Oilite bushings, and stainless steel oscillator plates. Oscillating plates gently channel bottles for even distribution to all washer pockets.

Table is powered by a ⅓ hp. gear head motor, and it is designed to blend in appearance with bottle washer.

Floor space requirements are held to a minimum, since unit requires only 2 ft. more than conventional magazine feed.—*The Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago* 23.

Circle 87A on Reader Service Card

New Valve Controls Bulk Materials Flow



Movement of bulk materials from bins, hoppers and chutes in weighing, blending and packaging operations can be regulated by a new, revolutionary type of valve. Unit can also be employed for free-air control in heating, ventilating and drying jobs.

New valve has a flexible diaphragm made of cotton duct, nylon, rubber, or other material suitable to the application. Operation is similar to that of the iris diaphragm of a camera, so that rotation of the control lever increases or decreases the opening of the diaphragm and the flow. Material passed through the valve does not come into contact with any moving metal parts, thereby eliminating possible jamming and clogging when the flow is reduced or stopped altogether.

Valve can be readily attached to bin and hopper discharge openings, to supply chutes and ducts, and air ducts. Fabric diaphragm will withstand many months of hard usage and is replaceable at low cost. Valves are available in five different sizes.—*Syntron Co., Homer City, Pa.*

Circle 87B on Reader Service Card

Compactness Marks Electronic Timer

Automatic control of operation, limit, and sequence timing for industrial processes is provided by a new, compact electronic timer.

Unit was specially designed, says maker, for flexibility of application, accuracy in operation, low maintenance, and simplicity in servicing. It is available in three time ranges: .06-1.2 sec., 6-12 sec., and 6-120 sec.

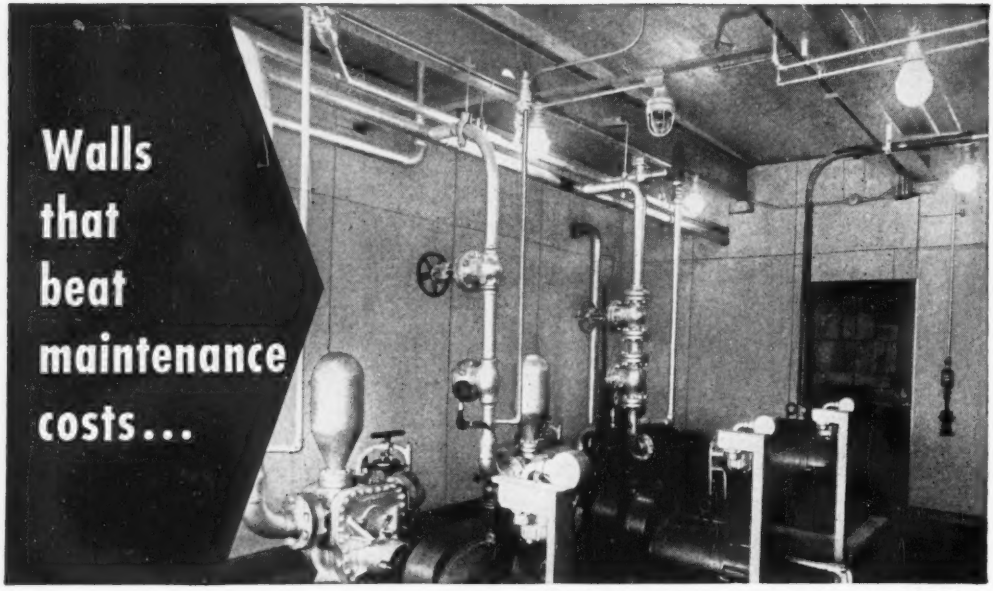
Timer features a detachable back plate which mounts directly on a rigid conduit or on any flat surface. Wires are brought to the back plate and pulled through, and unit is then mounted on the plate by means of four screws. Wiring to terminal boards completes installation.

Space between the terminal board and the cover provides adequate room for all front-connected wiring, including that for accessories. A dual set of contacts permits control of two operations on the same time schedule.—*General Electric Co., Schenectady 5, N. Y.*

Circle 87C on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service Section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.



Water treatment room in large utility plant. Walls are "Century" APAC, 5/8" thickness.

they're "Century"® APAC!

In the water treatment room above you see how to build walls that won't need maintenance: Use "Century" APAC—Keasbey & Mattison's versatile asbestos-cement structural sheet. APAC can fill nearly all your surface covering needs . . . interior walls and ceilings . . . exterior walls . . . on new structures and modernizations.

CONSIDER THE ADVANTAGES OF APAC:

APAC won't burn! Made of asbestos fibers and Portland cement—both inorganic—APAC will not support combustion . . . makes an excellent fire-retardant barrier!

APAC is maintenance free! It cannot rot, rust, or corrode—rodents and termites can't hurt it. APAC doesn't even need protective painting to preserve it!

APAC is easy to handle—easy to apply! Can be cut and fitted on the job—no milling or planing to bother with. Large-size sheets (standard 4′ x 8′) facilitate rapid coverage. Can be fastened with ring fettered nails or screws. Application labor costs are kept to a minimum!

You'll find "Century" APAC used today in hundreds of plants, in dozens of industries: For siding, office paneling, fire-resistant sheathing in shops and stockrooms, storage bins, linings for elevator casings, shower stalls—in fact, wherever quick, economical construction and maintenance-free service are wanted. Write us for complete information on "Century" APAC and the name of your nearest distributor.

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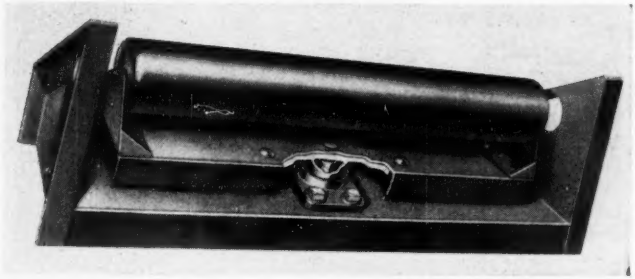
Self-Aligning Return Idler Protects Belt



Damage due to roving is reported reduced and centering bettered with use of an improved type of self-aligning belt-conveyor return idler.

Most belt damage from roving occurs at the edges on the return run. Here, the belt is closely confined between the frame and supports and is usually out of sight and difficult to observe. It is also important that the belt be centered entering the tail pulley, to insure central loading on the carrying run.

New Rex Idler (Style 33RA) minimizes the possibility of belt trouble from roving because it provides automatic alignment. Thus, side guide rolls are not needed. Idler is mounted on a roller-bearing turn-table, with entire assembly tilted 45 deg. in direction of return belt travel.

Lateral movement of belt moves that side of roll forward, and because of tilt, downward, thus decreasing belt pressure on that side. At same time, opposite side of roll moves back and upward, increasing belt pressure on its side.

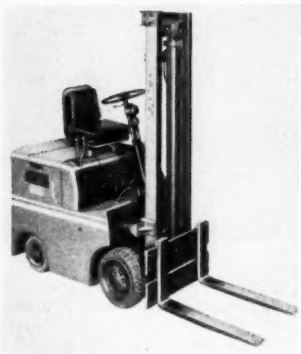
Through this counterbalancing action, belt automatically returns to its central position. The idler sensitively maintains an equilibrium at center of roll. Action is stated equally effective with horizontal, inclined or declined conveyors and is reported unaffected by build-up of material on the roll.

It is recommended that these self-aligning return idlers be located to include one unit close to head pulley (to immediately center the return run), with one unit close to the tail pulley (to center the belt for loading), and additional units at 10 to 15 normal return idler spacings, as conditions warrant.

Each idler is equipped for high-pressure greasing with a hydraulic-type fitting as standard. Unit can be supplied with 4, 5 or 6 in. dia. steel rolls, also with a 5½ in. dia. rubber-covered spiral roll.—*Chain Belt Co.*, 1600 *W. Bruce St., Milwaukee* 4.

Circle 89A on Reader Service Card

Fork Truck Is Fast, Safe, Simple to Operate



This new Clipper is an Electric battery-powered fork-lift truck with many new features.

Among them are: Increased speed, 2,000-lb. capacity at 24-in. loadcenter, "finger-tip" directional level, automatic acceleration, "deadman" safety control, pivot-mounted steering axle, and cushion-style tires.

The "finger-tip" lever is mounted on steering column for selection of direction of travel and simultaneous engagement of first point-of-power. This simplifies operation, increases maneuvering speed, and permits fast getaway.

Advantages provided by automatic acceleration include curbing of jerking and the possibility of human error. Shifts from one point of power to another are timed automatically in accordance with torque requirements.

When the driver's seat is vacated, the control lever is locked in neutral, and a parking brake on the motor drive shaft is set automatically. Truck can be moved only when the driver's seat is occupied, (or depressed).

Easy steering is accomplished by means of pivot-mounted steering axle with a "no-kick-back" feature.

Specifications: Overall length (less forks), 63⅝ in., overall width, 34½ in. wheelbase, 37 in. turning radius, 61½ in. minimum intersecting aisles, 57 in. Overall height of standard uprights with forks down is 83 in. and overall height at 124-in. maximum lift is 142½ in. Other uprights and tiering heights are available.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Circle 89B on Reader Service Card

Electric Chain Hoist Speeds Lifting Tasks

Developed as economy units for efficient, fast-action lifting jobs, the new Type "JC" electric chain hoists are available in ¼, ½ and 1-ton capacities.

Maker states that use of this hoist for miscellaneous lifting tasks will cut expenses by saving time and effort.

Unit is equipped with simple rope controls. Designed for hook suspension, it is adaptable for trolley mounting with the R&M Bulldog Trolley. Construction is of high strength cast aluminum alloy with heat-treated gearing and high carbon or alloy steel ground shafts. Precision ball bearings are used.

Relatively light in weight, unit is easily transported to areas of greatest activity. A link type steel chain—single on JC-15 (500 lb. capacity) and JC110 (1,000 lb. capacity), and double on JC-120 (2,000 lb. capacity)—is described as providing flexible dependable hoisting operations. Hoist can be adapted to any length lift (depending upon ceiling height or lift required) by adding necessary lengths of chain and control ropes.—*Robbins & Myers Inc., Springfield, Ohio.*

Circle 89C on Reader Service Card

for FAST HANDLING of LARGE TONNAGE

Jeffrey Belt and Spiral Conveyors

Take material away as fast as it comes, send it on its way quickly, steadily and economically . . . that's the job of Jeffrey belt and spiral conveyors. Here you see tons and tons of raw sugar being handled from railroad cars, through lump sugar breaker, and on to the refining process. Dependable operation and steady flow mean more profit to the operator. Whether individual units or complete systems . . . Jeffrey engineers will see you through. Send for literature.

Bin Valves
Bucket Elevators
Car Pullers
Crushers
Chains
Conveyors
Coolers
Feeders
Idlers (belt)
Packers
Pulverizers
Screens
Sprockets
Transmission Machinery

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Jeffrey Mfg. Co. Ltd., Montreal, Canada
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S.A.
The Ohio Malleable Iron Co., Columbus, Ohio
British Jeffrey-Diamond Ltd., Wakefield, England
The Galion Iron Works & Mfg. Co., Galion, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

Gas-Fired Incinerator Is Fast, Thorough

Complete consumption—in minutes—of wet or dry garbage and waste material is reported with use of air-cooled, automatic, gas-fired incinerator.

Unit, of durable steel construction, is compact and hence takes little floor space. It consists of an airtight, heavy gage, steel casing interlocked at four corners with upright steel posts. A three-fold system that keeps the heat within the incinerator is accomplished by insulating material within the case, a 2-in. circulating air space, and a refractory lining that is 2 in. thick.

Combination grate and burner assembly, with a series of 30-deg. angle openings, produces an extremely hot vertical jet flame that completely consumes wet or dry garbage, trash, rubbish, bones, or anything burnable. Incinerator economically burns natural, manufactured, or mixed gases, and fuel oil burning equipment is available in areas where necessary.

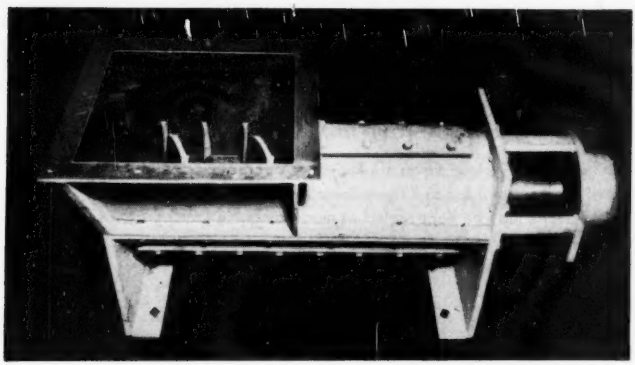
Burner is automatically ignited by a constant low-burning pilot fire. A clock is included that may be preset for a predetermined burning time. It automatically controls the burner and stops the flame when the time has expired.

Cooling is by ample circulation of air, and there is created a dehydration action that prevents odors.

Circulation is accomplished by a blower that simultaneously mixes the cool air with the hot air exhaust, increasing the air intake for higher combustion. Unit may be installed, just as is a furnace, with every assurance of safety.—*ABCo Incinerator Corp., Cleveland.*

Circle 91A on Reader Service Card

Low Speed Prebreaker Has High Capacity



Utilizing high torque at relatively low speeds, this new prebreaker is reported to do a very effective crushing and breaking job. Maker states that in many applications it does the work of jaw, roll, and rotary crushers, hammer mills, shredders, and like equipment.

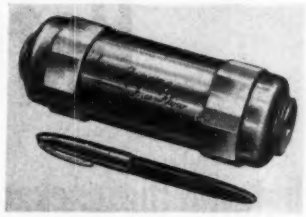
It is particularly applicable in food plants where green bone, frozen food, raw fish and meat require breaking or crushing before actual processing can take place. High capacity at low speed helps minimize power costs.

Construction is simple, strong. All moving parts are readily accessible for servicing and cleaning and are capable of handling any heavy shock loads. Special accessories are obtainable from the manufacturer for use where unusual processing problems occur.

Prebreakers are available in five sizes, ranging from 10 to 100 rpm., ½ to 100 hp., 6 in. to 18 in. rotor dia., and 10-in. to 48-in. effective length. All models, including special designs, are made in both carbon steel and stainless steel to meet the user's specific needs.

In view of the many difficult problems in the general field of particle-size reduction, manufacturer offers laboratory and engineering facilities to service customers.—*Rietz Manufacturing Co., 441 Folsom St., San Francisco, Calif.*

Circle 91B on Reader Service Card



Surge Damping Valve Prevents Shock

Excessive shock in high pressure hydraulic systems is stated to be eliminated by new surge damping valves.

They comprise individual units universally adaptable to any hydraulic circuit. Models are available in a range of sizes for wide application.

Small, light, and compactly designed, they are installed as easily as any ordinary fitting and do not interfere with other functions of the circuit. Maker states that test setups over many months have proved that the valve successfully prevents shock rather than simply absorbing hydraulic surge and consequent shock.

Operation of the valve is on the principle of uniform acceleration. This assures smooth, shockless action in the circuit, regardless of pressure used. Valve adjusts itself automatically to any working pressure, requires only a fraction of a second to act, and cannot slow down cycle time. It prevents the damaging vibrations caused by sudden starting.

A normally closed valve, it gradually opens when pressure is applied to the inlet side. When flow is interrupted, the valve quickly resets and is ready for the next operation. It requires no manual adjustments and has no external drain.

The valve has its simplified component parts compactly arranged. Spool inside is normally held closed by a spring to stop flow from inlet to outlet. It moves to fully open position at a rate controlled by a small, built-in valve that is responsive to the difference between outlet and inlet pressures. This produces different opening speeds at various pressures.

An unusual feature is that the valve will open at a slower rate of speed at high pressures than at low pressures, when the valve is subjected to sudden surges of fluid. Also, the rate of flow will increase as the pressure in the outlet line of the valve approaches that at the inlet side.—*Denison Engineering Co., Columbus, Ohio.*

Circle 91C on Reader Service Card

Betner...*America's Busiest Bags*

Whatever the packaging need, there's a Betner bag to fill it!

Just a few examples of Betner's complete bagging service:

DUO-TITE... *the Perfect "No-Sift" Bag*

At last, the ideal bag for products which must be packaged in siftproof containers . . . insecticides, fertilizers and other dry chemicals. DUO-TITE's sturdy construction combines special liners with folding, gluing, and heat-sealing. Available in sizes holding up to 25 lbs. of bulk powdered material.

THERMOSEAL... *the Bag with 20% More Protection*

It's a fact. There is 20% more protection offered by Betner's THERMOSEAL than by other closures. Best of all, THERMOSEAL eliminates staples and other adhesives, and insures water-vapor protection, siftproofness and retention of flavor.

BENCOSEAL... *the Bag or Wrap with Extreme Water-Vapor Protection*

Absolute sanitation, dryness and flavor freshness are guaranteed by this unique combination of paper, metal foil and tissue laminated with a thermoplastic wax film. BENCOSEAL may be heat-sealed at moderately high temperatures without fear of blocking, thereby rendering itself to high speed production. It lends itself to any type of printing for consumer eye-appeal.

FLAV-O-TAINER... *the Bag with Vacuum-Packed Freshness*

Whenever freshness is a must—Betner's FLAV-O-TAINER delivers it! Lined with Pliofilm (mfd. by Goodyear T. & R. Co.), all inner seams are hermetically sealed. And simply by replacing air with inert gas, and heat sealing at top, FLAV-O-TAINER becomes an air tight unit.

A complete bag service...

from idea to finished bag. Also machinery for closing coffee bags, and inserting and closing liner bags in cartons. Your inquiries are welcome. Samples with full technical information will be promptly supplied.

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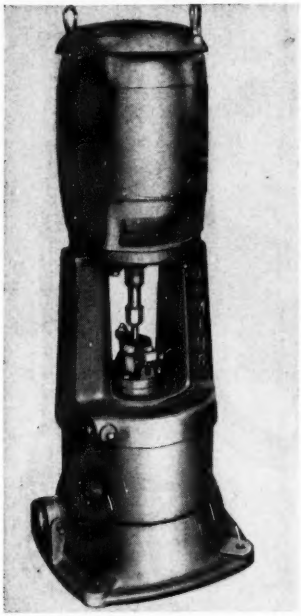
BENJ. C. BETNER CO. of VA., Richmond, Va.; BENJ. C. BETNER CO., of WISCONSIN, Appleton, Wisconsin; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California; Southern Packaging Corporation, Affiliate of BENJ. C. BETNER CO.

High Pressure Pump Needs Little Space



Vertical construction minimizes floor space required for this "multi-stage" high-pressure centrifugal pump.

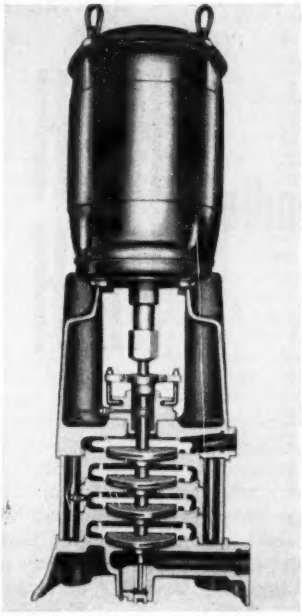
Designated as the "Fig. 6606," it has wide application in general industrial use where liquids handled are non-corrosive to iron and bronze. It is also efficient for boiler feed service for temperatures under 250 F.

Pumps are furnished in 2, 3, 4, and 5-stage construction, with 1½ in. suction and 1 in. discharge openings. Each stage is a separate section, with all stages held together by large through-bolts outside of the water passages. Right photo shows cutaway of 4-stage unit.

Pump and motor are built together as one unit. Vertical type motor has standard "MEMA" type "C" mounting flange. Motor bearing is of ample size to carry the small thrust load of pump. Stainless steel pump shaft is coupled to motor shaft with compression-sleeve type coupling.

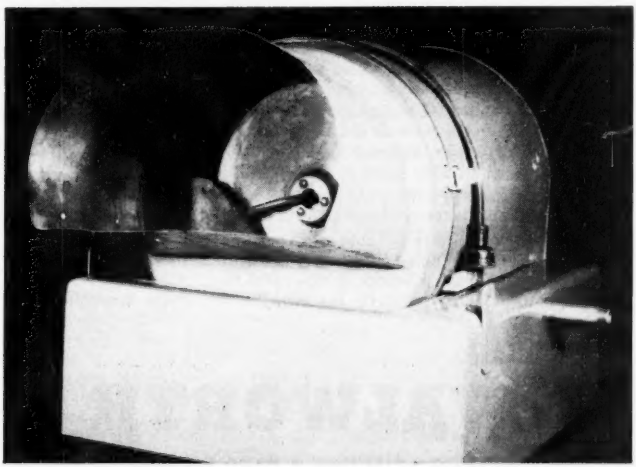
When specified, a mechanical seal replaces stuffing box packing.

Capacities range from 10 to 45 gpm. against heads up to 400 ft. with 2, 3, and 5 hp. motors operating at 3,500 rpm.—*The Deming Co., Salem, Ohio.*



Circle 93A on Reader Service Card

Compact Humidifier Requires Only Water Feed Line



Use of ducts, pumps, compressed air or steam lines is reported unnecessary with this new humidifying machine.

Called Impsco, the unit is a complete system in itself. It requires only a water feed line. No return water line is needed.

Unit operates on the principle of atomization through centrifugal force, emitting a mist-like vapor. Installation, maintenance and operating costs are reported low. Savings are also claimed from fact that all parts of unit are of standard manufacture, simplifying repairs. The only part that requires regular replacement is the fiber glass filter over the intake, and this element is obtainable through any supplier of air conditioning equipment.

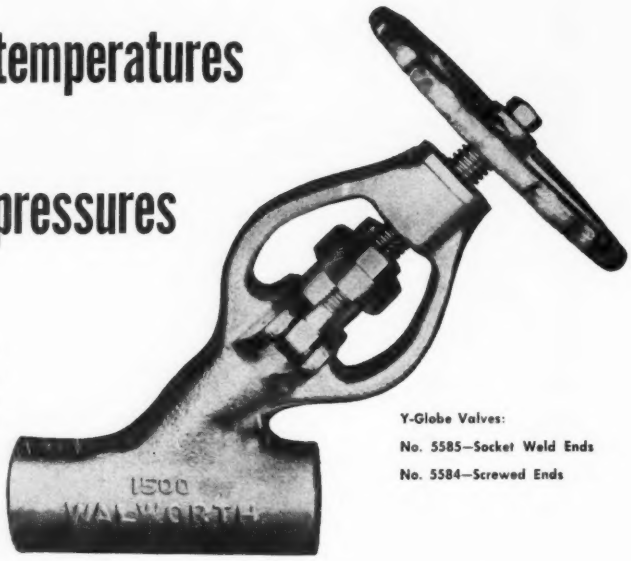
Details: Vaporization capacity, 1 gph.; weight, approximately 50 lb.; dimensions, 12 in. width, 14-in height, 22-in. length; motor, ¼ hp., 110-v. 60 cycles. Water may be used from ordinary drinking mains at regular pressure. Vapor is emitted in only one direction, so units can be mounted on walls, corners, or supporting posts of plant.—*Industrial Materials Purchasers, 401 Broadway, New York City.*

Circle 93B on Reader Service Card

Walworth's NEW small cast steel valves

SERIES 1500 – SIZES ¼ to 2 inches

handle { HIGH temperatures / HIGH pressures

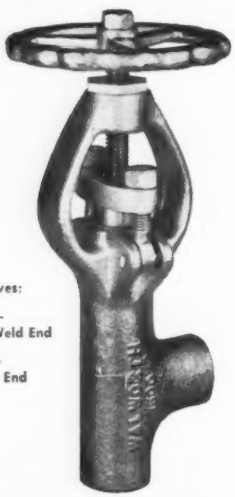


Y-Globe Valves:

No. 5585—Socket Weld Ends

No. 5584—Screwed Ends

Walworth is proud to make these new Small Cast Steel Valves available to power stations . . . oil refineries . . . ships . . . wherever piping is subject to severe pressures and temperatures. Non-shock service ratings of these valves: 1500 psi–950F for steam; 3600 psi–100F for water, oil or gas. Cast of chromium molybdenum steel, they are compact and light, yet exceptionally strong. Both Y-Globe and Angle type valves are available.



Angle Valves:

No. 5587—
Socket Weld End

No. 5586—
Screwed End

Simplified Walworth design eliminates many of the valve problems encountered in high pressure service. Among the features of this new valve are:

INTEGRAL BODY AND YOKE – made from a single casting without threading or welding. Bonnet joint — always a potential source of leakage — is eliminated. Valves can be reassembled quickly and easily.

ROTATING DISC – prevents valve seat distortion and consequent leakage. Cuts down replacements.

WELDED SEAT RING – compensates for changes in pressure and temperature—eliminates a major source of leakage.

SPECIAL BACK SEAT BUSHING – permits repacking the valve under pressure with greater safety.

PACKING CHAMBER – designed to dissipate heat thus keeping packing rings at lower temperatures—gives them longer life.

These valves are available with either socket weld ends or screwed ends, in sizes ranging from ¼ to 2 inches. For further information on Walworth series 1500 Small Cast Steel Valves, see your local Walworth distributor, or write for Circular No. 134.

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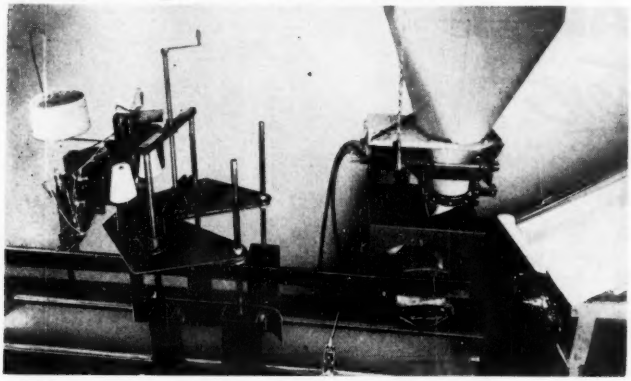
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Automatic Bag Closer Cuts Labor Need



With use of this new bag closer, labor of at least one operator is reported saved.

Designated as Model 1210-M, unit permits open-mouth multiwall bags, up to 46 in. in length, to be automatically passed through high speed sewing heads.

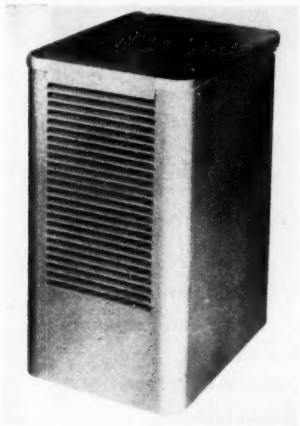
This closer complements the original smaller machine, Model 1210-A, that pre-forms and sews consumer unit size bags at speeds up to 2,000 per hr. Each model operates on the same basic principle.

In operation, moving conveyors lead the filled bags in between two V-belts. The latter collapse the tops of the bags and move them through the sewing head for an automatic sewn closure. On the multiwall bag model, speed of conveyor is synchronized with speed of sewing head at 34 ft. per min. Thus, production rate is limited only by efficiency of packaging operator and bag-filling speed.

Multiwall model is of all-steel welded construction, and it is fitted with roller bearings throughout. Closer is delivered complete with a Union Special (Style 80600E) sewing head (which effects the conventional sewn closure) and the standard 10 ft. conveyor. Conveyors of 15 and 20 ft. lengths can also be furnished as specified. Unit can be coupled with existing filling equipment.—*Union Bag & Paper Corp., 233 Broadway, New York City 7.*

Circle 95A on Reader Service Card

Compact Dehumidifier Can Be Readily Moved



Designed for a wide range of dehumidification jobs, this ⅛ hp. Humidry unit has been made completely portable.

Improved model, weighing only 60 lb., has been fitted with casters and handholds so that it can be easily moved wherever needed. Unit can be plugged into any standard 115v. circuit.

Dehumidification capacity per horsepower is stated to be exceptionally high. Under conditions of 80 deg. F. and 70 percent relative humidity, it is reported capable of removing as much as 18 pt. of water from the air in an average space every 24 hr. of operation.

High capacity is credited to the special vertical arrangement of spiral finned evaporator coils (patents now pending). The constant downward drainage of water along the spiral fins maintains a damp clean coil surface, and at the same time prevents an accumulation of water on coil, thus insuring the most effective heat transfer conditions.

Unit is enclosed in an attractive, flat-topped, rectangular cabinet having a baked enamel finish. It measures 23½ in. high, 17½ in. long, and 13½ in. wide.

Condensed moisture can be disposed of through the nearest drain by attaching a piece of rubber tubing to the drip pan spout. A removable condensate pail is also provided with the unit.—*Carrier Corp., Syracuse, N. Y.*

Circle 95B on Reader Service Card

Paperboard Cartons Are Water and Stain-Resistant

Impervo Board, a new paperboard termed highly resistant to water absorption, is now being used in frozen food cartons.

The new development is a specially-treated board that is waxed on two sides for both water and stain resistance.

Tests have shown it retains its stiffness after a carton has stood half full of water for many hours. This resistance to water penetration is far beyond the needs of commercial use.

Highly resistant also to vegetable stains, the board remains white, thus enhancing the appearance when the homemaker opens the carton.

In the processing plant, the new cartons are stated to permit faster production and smoother automatic packaging operations. Strength of board and its coating is a preventive against softening and sagging of cartons. Special waxing keeps products from sticking to board during quick freezing.

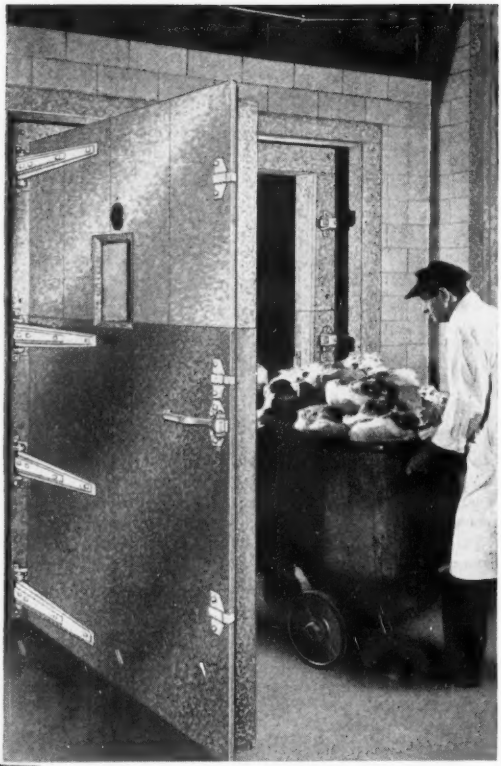
Additional advantage reported is that the all-purpose carton made of the new board serves equally well for dry, semi-dry, and wet-pack items, thus simplifying inventories. Cited also is economy in giving protection against moisture loss.

Construction and size are the same as for the company's present top-opening one-piece carton with hinged cover. Overwraps currently in use will fit perfectly over new cartons.—*Marathon Corp., Menasha, Wis.*

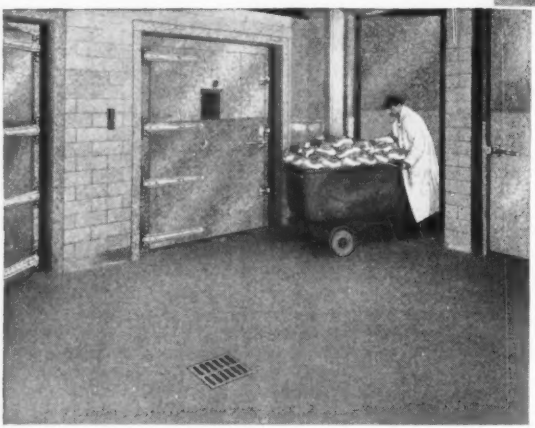
Circle 95C on Reader Service Card

METAL CLAD
for Sanitation
JAMISON
SERIES "50" DOOR
IDEAL FOR PACKING HOUSES

THE H. H. MEYER PACKING COMPANY, OF CINCINNATI, joins the long list of Packing Houses from coast to coast installing JAMISON Series "50" Doors—METAL CLAD—*for extra sanitary protection.* The continual "washing down" in Packing Houses requires sturdy, sanitary, watertight doors. These features, and the others listed on the right, insure that you get the most for your money when you get JAMISON. Jamison Cold Storage Door Co., Hagerstown, Md., U. S. A.



FULLY METAL CLAD . . . Door Matches Sanitation of Walls and Floor So All Can Be Washed Down.



STEEL KICK PLATES AND STEEL FRAMES . . . Provide Extra Strength for Protection Against Battering of Trucks and Support for Extra Width Doors.

You get more for your money

- **"Monopanel" Construction**
- **E-Z Open, Two-Point Fasteners**
- **Adjustoflex Hinges**
- **Lo-Temp Gasket**
- **Unbroken Insulation**
- **"Vaporseal" Vapor Barrier**

THE LEADER FOR OVER 50 YEARS

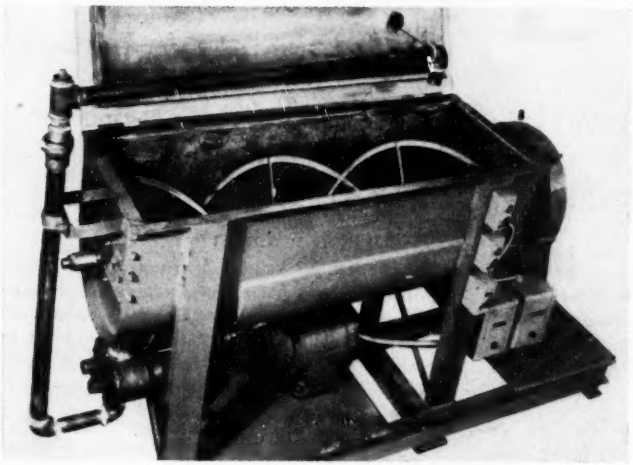
Tilting Mix-Cooker Now Has Draw-Off Valve

Addition of a large draw-off valve at the bottom is the new feature on this tilting mix-cooker. Thus, product being cooked can be drained off either via rim lip or through the new bottom valve.

Steam jacket on this unit covers two-thirds of kettle area. Fabrication is of stainless steel in gages required by ASME code or heavier. Either double- or single-motion agitators may be specified, with maple or plastic scrapers. Agitator arm is hydraulically-lifted.—*Hamilton Copper & Brass Works, Inc., Hamilton 7, Ohio.*

Circle 97A on Reader Service Card

Mixer Provides Paste of Uniform Consistency



This new 60-gal. stainless steel, heavy duty paste mixer is designed to provide a method of supplying paste of uniform consistency, characteristics and temperature under accurate discharging conditions.

Unit is built with a rectangular mixing tank having a half round bottom, with inside dimensions of 51-in. length, 30-in. width and 18¼-in. maximum depth. Tank is jacketed on the round bottom for 36 in. of its length for steam heating at 125 psi. working pressure.

A full-length, stainless steel, ribbon-type spiral agitator, with inner and outer ribbons having opposite thrusts, is employed for thorough mixing. Agitator shaft is driven through a 4-to-1 reducing chain drive at approximately 87 rpm. by a 2 hp. gearhead motor mounted on the channel iron base.

Curved cover is hinged for quick access for filling and cleaning purposes. Discharge, through a 1½-in. opening, is handled by a rotary pump driven by a 1½ hp. gearhead motor. Here, piping is of swivel joint design to make vat or drum loading fast and simple. Spillage losses are reported kept to a minimum by use of two-pump "start-stop" and "momentary fill" push-button controls. Discharge line has thermometer for checking temperature of the paste.—*L. D. Koven & Brother Inc., Jersey City, N. J.*

Circle 97B on Reader Service Card

Photo-Electric Eyes Guard Against Fire

Instantaneous detection of fire is reported with use of a new protection system.

Called "Fireye", it derives its name from the principle of "seeing" fire, rather than depending on detection of heat or smoke. Based on the photo-electric idea, the unit is capable of detecting a very small fire, yet is designed to ignore extraneous light of any intensity, such as the sun or artificial illumination.

Protection block, consisting of six detectors and one control panel, provides coverage up to 120 x 80 ft. (10,000 sq. ft.), since each detector will monitor any area within a radius of 20 ft. For areas larger than this, combinations of blocks may easily be made.

Installation of system in plant is stated to be simple.

System offers a self-monitoring feature which assures that the equipment is operating and in constant readiness to detect fire. A low-intensity electrical pulse is continuously applied through all circuits. Loss of this signal from any wiring or component failure will actuate a relay to give a distinctive trouble warning.

Connections can be made to a wide variety of existing alarm and automatic extinguishing systems. Arranged in series circuit for wiring simplicity, detectors mount directly on any standard 3-in. outlet box. Control panel is designed for wall mounting, and its quickly removable plug-in chassis is intended for maximum convenience in installation and wiring.—*Fireye Corp., 77 Broadway, Cambridge 42, Mass.*

Circle 97C on Reader Service Card

You'll agree with the Food Business that Stainless Steel is good Business

FOOD processing and packing is an art and science in which the United States leads the rest of the world by the proverbial country mile. It means something, therefore, that U. S. canners, packers and bottlers predominantly use equipment made of stainless steel.

It means that, as good businessmen, they've found that stainless steel best protects flavor and purity, makes cleaning easier and less costly, and gives longer service life with less maintenance. Stainless *does* these things best because no other commercially available metal is as strong and as resistant to corrosion, heat and wear, taking all these virtues together.

Consequently, in a national emergency, the time-tested stainless steel—Allegheny Metal—is more than ever "good business" for many highly essential applications. Less essential uses have to give way to jet engines, aircraft and marine equipment, transportation, food, dairy, chemical plant and refinery uses, etc. But we're continuing to spend many millions of dollars to expand our already multiplied production, and we offer every assistance to fabricators to make the supply of stainless steel go as far as possible.

* * * * *

Complete technical and fabricating data—engineering help, too—are yours for the asking from Allegheny Ludlum, the nation's leading producer of stainless steel in all forms. Branch Offices are located in principal cities, coast to coast, and Warehouse Stocks of Allegheny Stainless Steel are carried by all Joseph T. Ryerson & Son, Inc. plants. ● *For any assistance*, write or call Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.

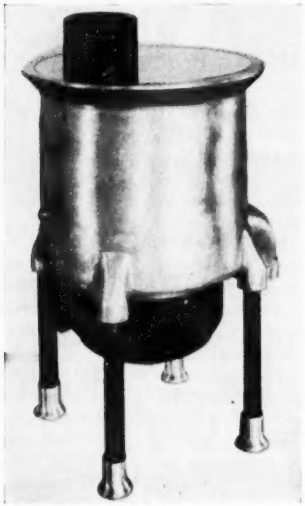
You can make it **BETTER** with

Allegheny Metal

AL
TIME-TESTED STAINLESS STEEL

WAD 3358

Waste Disposer Discharges Directly From Equipment

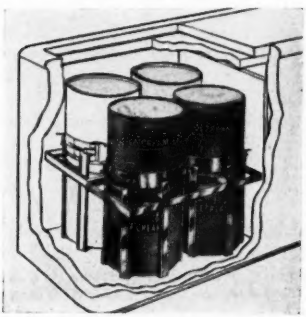


A heavy-duty waste disposer discharges from food processing equipment right into the sewage system. Fineness of grind enables discharge as a flowing liquid.

The unit, 2 ft. in dia., is powered by 5-hp. motor in an aluminum non-corrosive housing. Seavenger service and the labor force necessary to handle waste products can be eliminated.—*Herlex Mfg. Co.*, 1442 *W. Van Buren St., Chicago 7.*

Circle 99A on Reader Service Card

Bulk-Carton Holder Saves Ice Cream Dipping Time



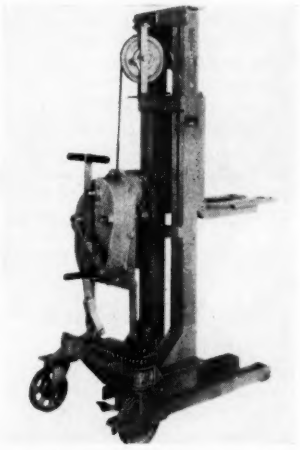
Ice cream companies will be interested in this bulk-carton holder stated to save one-third of retailer's time taken in dipping. Called Rigidip, it is made of rust-proof steel and has a ribbed reinforced steel framework and a wide band that grips the bulk-carton and holds it in place for dispensing. This band is tightened with a snap-spring release and level.

Elevator rods on each side of the carton enable operator to eject empty carton and raise reserve carton into position in only 6 sec.

Regular size holds either two 2½-gal. cartons, or one 5-gal. carton. Adjustment bar enables holder to fit any size cabinet or fountain. The unit not only aids uniform dipping but also prevents loss and spoilage of ice cream caused by damage to the bottom reserve carton in the cabinet.—*Blake Sales Co., Los Angeles.*

Circle 99B on Reader Service Card

Portable Pallet Elevator Triple-Decks Loads



Double and triple decking of single-faced pallet loads can be accomplished with this portable pallet elevator. It is built with any lifting height required.

Operator guides the forks (lowered height 3½ in.) under the pallet and cranks the load up to the desired height. He then runs the elevator to the load space, opens the brakes, and lowers the pallet load.

Hand or electric operation is available. Former has two speeds, governor control, and spur gears enclosed and running in oil. Latter is ball bearing and has cable control, electric solenoid brake, thermal overload switch, top and bottom limit stops, and 25 ft. of electric cable.

Capacities of 2,000, 3,000, 4,000 and 5,000 lb. and offered.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Circle 99C on Reader Service Card

Plastic-Wire Carrier Is Quieter, Safer

Bottle breakage and noise are curtailed with use of this new plastic-coated carrier.

Coating provides a softer surface for cushioning the bottles. It adheres to the wire case indefinitely, according to maker, who states it is superior because it is more resistant to grease, oil and temperature changes. The coating has a smooth surface to which dirt does not readily cling. This makes cleaning simple and fast.—*United Steel & Wire Co., Battle Creek, Mich.*

Circle 99D on Reader Service Card

New Air Filter Unit Has High Efficiency

A new high velocity unit air filter—the American Type HV—is made of corrugated strips of fine mesh wire in which the corrugations taper so that when two strips are placed together they form a series of pyramid shaped pockets.

The small ends of the pockets are closed to the air flow to eliminate any open air passages through the media.

These filters are designed to operate at velocities up to 500 fpm. and maintain a uniformly high cleaning efficiency over a wide velocity range. They can be serviced in the conventional way with washing and charging tanks or reconditioned by washing out the accumulated dust with a hose and spraying with filter adhesive.—*American Air Filter Co., Inc., Louisville 8, Ky.*

Circle 99E on Reader Service Card

In Behalf of Progress . . .

Engineer Better Quality Into Your Products

Food processors have done an excellent job of improving their products in the past decade. And much credit goes to chemical processors who make ingredients to improve food and fertilizers and insecticides to increase production.

But despite the gourmet level of the American food supply, competition and cost considerations continually force food processors to make better products at lower relative cost. This is as it should and must be in a vital, growing industry.

The industry, however, has reached a stage were it pays a processor to be most cautious in respect to what he adds to a product to make it better and what he puts into a newly developed product.

There is a growing concern among consumers and physicians about the allergic effects of ingredients in processed foods. It is relatively easy for a consumer to eliminate from his diet basic foods such as orange juice or tomatoes, to which he is allergic. This does not restrict the diet too much nor reduce the consumption of many foods. But when a consumer is allergic to a minor ingredient widely used in processed foods, the problem becomes much more complicated and serious to everyone concerned. The complexity of the problem is summed up in this remark by a New York physician: "Consumers and their physicians always must be on guard against food substances which lower a particular person's resistance to disease but which do no direct damage to the consumer."

Obviously, when a person is distressed by one ingredient in a food, all processed foods containing that ingredient are crossed off his list. And processed foods in general get a black eye.

So the simpler the formula and the fewer the changes in ingredients, the less the allergic damage it will do and the fewer the consumers it will alienate.

Therefore, the safest way to improve a processed food is to engineer higher quality into it. Texture, color, taste, vitamin content and shelf-life often can be enhanced by improving the process or the package. This is exemplified by short-time, high-temperature heat treatment, removal of deteriorative elements such as heavy metals, better sanitation, more rigorous process control, and processing and packaging under vacuum or inert gas. And, of course, reducing factory-to-consumer time and using better distribution facilities offer great opportunities for quality improvement.

Sooner or later the spotlight will be thrown on the allergic effects of common processed foods. And in the current furor over "chemicals" in foods, processors should not lose sight of the fact that that many "harmless" ingredients alienate allergic customers and the medical profession from their products.

A great many people are food-sensitive.

Supply the Antidote for That Price Poison

Food processors not long ago were indicted by labor leader Walter P. Reuther as being that faction of the food industry responsible for today's high retail food prices. In his attempt to defend high farm prices, Secretary Brannan implied the same thing. The fluid milk industry many times has been accused of profiteering by local officials whose aim was to curry public favor.

The same goes for bakers. And, more recently, public criticism of cattlemen for strong opposition to the meat-price rollback has indiscriminately fallen upon meat packers.

If such unjustified attacks and criticism continue, they not only will put food processors in the dim light of public opinion, but they will serve as the justification for still more discriminatory legislation and controls.

The industry has taken such unjustified criticism lying down. Nathan Cummings, president of Consolidated Grocer's Corp., pointed up a significant failure on the part of food processors when he said:

"The food industry has done a poor job of presenting its side of the food-cost situation to the consumer. It has failed to show the public how labor costs, processing, transportation and distribution go into the price of food over and above the amount paid to farmers for produce.

"The result of this failure to tell the public the facts of low-cost, high-quality food has been discriminatory legislation, unfavorable public opinion and hostility to the industry's best efforts."

It seems that a food industry public relations program aimed at telling consumers how much they get for their money has become nearly as necessary as the fundamental job of producing quality foods efficiently.

Individual food processors should present their individual stories to consumers through publicity and advertising. Associations should go to bat for their branches of the industry—as American Meat Institute has done. And an all-industry effort should be made by a group of large processors.

It is imperative that the industry tell its story of costs and values to the people and the politicians.

Here's Evidence...

THAT

WHITNEY

Level-Line CONVEYOR CHAIN

Delivers Materials... Smoothly, Steadily, Safely at lower cost

● The typical applications below are visual evidence that Whitney Level-Line Conveyor Chains can and do increase production and cut costs in conveying and transferring of bottles, cans, packaged goods, etc.

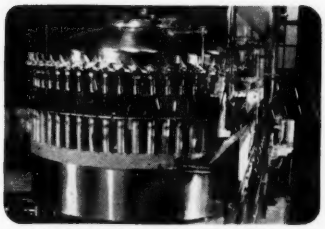
Here's how — the roller chain cushions and absorbs shock . . . provides uniform delivery and discharge of materials . . . reduces spillage and breakage. There is no chatter . . . no vibration over any conveyor length . . . at any conveyor speed.

The smooth contour top plates permit safe transfer of bottle, can or packaged goods. There is no tipping or catching . . . simply *smooth* flow all along the line.

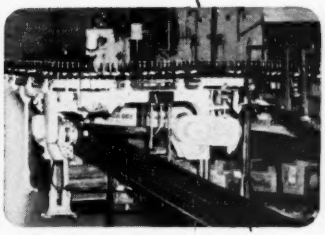
The simple, detachable design reduces down time . . . provides lower operating costs.

From the complete line of Roller, Silent and Conveyor Chain Drives, Whitney engineers can recommend without bias, the proper type of drive for each application . . . the chain drive which will give you the best service at lowest cost.

Consult your local Whitney Distributor or Field Office, or write direct to us for complete information and catalog.

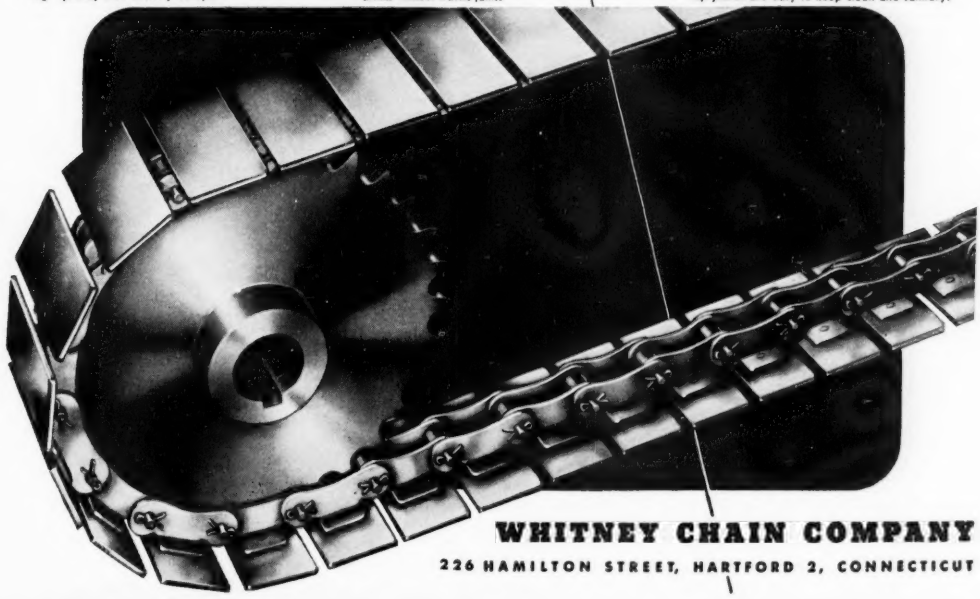


Whether it's large or small bottles, Whitney Level-Line Conveyor Chain keeps production moving at high speeds, without costly delays.



The smooth cushioned travel provided by Level-Line Conveyor Chain maintains high production of soft drinks without traffic jams.

Whitney Conveyor Chain assures steady, continuing production on the packing line in a cannery. Smooth top plates are easy to keep clean and sanitary.

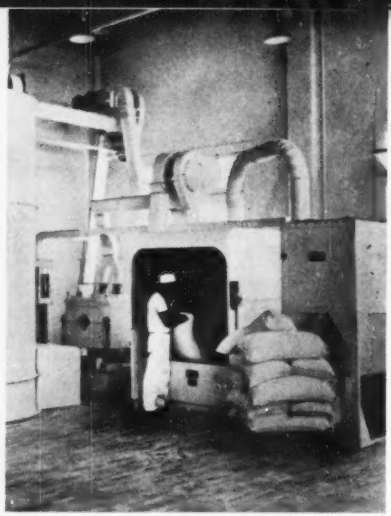


WHITNEY CHAIN COMPANY

226 HAMILTON STREET, HARTFORD 2, CONNECTICUT

TURN PAGE FOR FOLDOUT FLOWSHEET →

1 LIFT TRUCK moves and stacks barrels, drums, and bags on wooden pallets.



2 LOTS of flour are automatically blended, sifted, aerated, and stored in bins.

UNFOLD HERE

Mechanized Bread Making

Advanced Equipment on High-Speed Lines Improves Control, Raises Quality

TODAY'S BAKERIES are doing a plus-performance job in achieving greater production of quality bread per man-hour—up to 7,200 loaves hourly.

■ **Credited are the modern machines and automatic devices now employed on the up-to-the-minute processing and conveying lines. For they have made improved, high-volume operations possible with less manual labor.**

Here is how a typical modern bread bakery operates:

Incoming materials are handled by power lift truck. Processing starts when flour is dumped into a blender, from which it is transferred by screw and bucket conveyors to a sifter. Next, it goes to storage bins.

By dial adjustment, blenders can be set to mix different lots of flour according to any desired ratio. A second control, a level-detecting device, actuates a switch to stop delivering flour to bins, once they are full.

From the bins, flour is conveyed to electric weigh hoppers over the mixers. Water is metered into the mixers by automatic pre-set flow meters. A similar type meter is used for the emulsified malt-yeast enrichment mixture.

After mixing, the sponge is dumped into troughs, that are then rolled to an insulated fermenting room where temperature (80 deg. F.) and relative humidity (75 percent) are automatically controlled. After $3\frac{1}{2}$ to 6 hr. fermentation, troughs are rolled out to dough mixers, where electrically driven screw hoists lift the troughs and dump the sponge into the machines. Here, more flour and water are added.

Dough is again unloaded into troughs and permitted to rest in the fermentation room. Then, troughs are moved to another hoist that empties them into a divider equipped with an air dryer to eliminate flour dusting. The divider cuts dough into pieces—6 to 8 at a time.

Next, pieces of dough go to the loaf rounder and are formed into balls. These are then fed to a preliminary proofer through which they travel back and forth several times for about 15 min. Proofing is controlled at 80 deg. F. and 75 percent relative humidity.

Automatic panning and molding is next. Dough pieces are discharged from the proofer into a molder-panner. Each piece goes through two sets of rolls that presheet it. Another mechanism reverses the sheet, which then passes through a third set of rolls for final sheeting. Next, a power-driven mat curls the sheet. And the wet end of the sheet is curled in the center of the loaf. Finally, dough is panned by an air-operated unit.

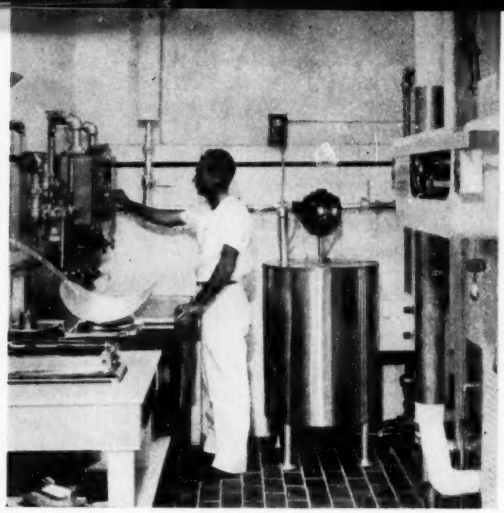
A chain conveyor carries the panned dough to the final proofer, where a bar pushes six straps of pans into the proofer. The "down-and-back" travel through the proofer takes about 60 min. The proofer is kept at 95 deg. F. and the relative humidity at 95 percent.

A vertical conveyor carries pans from proofer to traveling oven. Here, another bar pushes the pans into the oven. Temperature of oven is about 460 deg. F., and baking takes 30 min.

Ovens may be equipped with variable-speed drive, an electric tachometer that registers speed on a meter, and "slow" and "fast" pushbuttons for speed regulation.

Emerging from the oven, the bread may be automatically depanned. One such unit consists of a turnover devise that inverts a row of pans so that the bread drops into a chute and the empty pans are discharged onto a conveyor that carries them back to the molder-panner. Another conveyor then takes the bread to a continuous forced-air cooler. Temperature of this unit is 75 deg. F. and relative humidity is 75 percent. Finally, the bread is manually directed to slicing and wrapping machines.

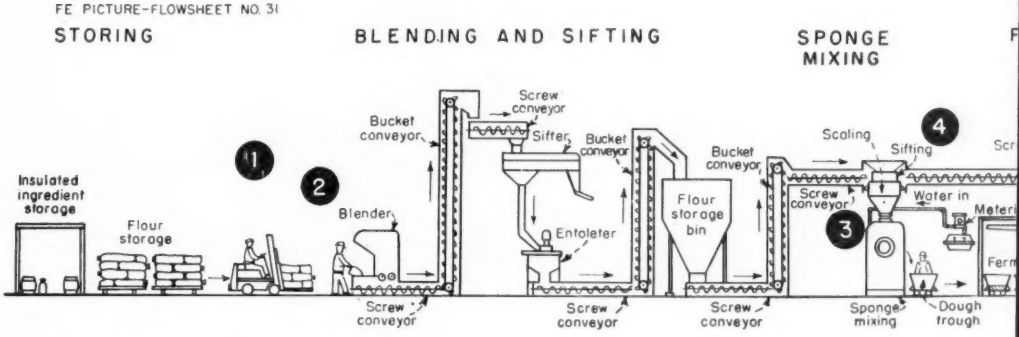
Photos used in this feature were supplied by Baker, Perkins, Inc.; Fuchs Baking Co., South Miami, Fla.; and Omar, Inc., Columbus, Ohio.



3 **FLOWMETER,** also scale beam (right), are adjusted to feed water and flour to mixers.

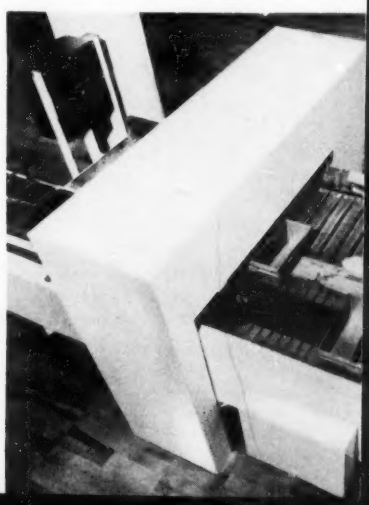
4 **TROUGH** of sponge is rolled into fermenter. Later, hoist (r dough mixer and dumps sponge into it.

FE PICTURE-FLOWSHEET NO. 31



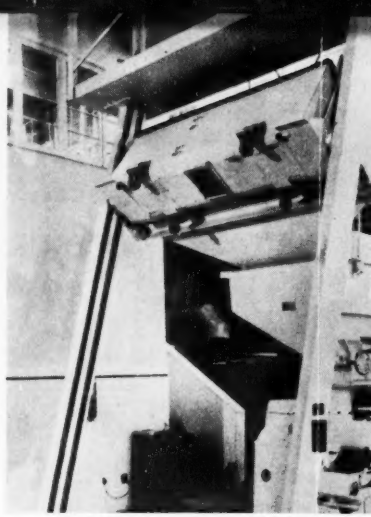
8 **IN THIS** multi-pocket proofer, dough balls become lighter as they double in volume. Travel time through unit: 15 min.

9 **HERE,** automatic transfer unit takes pa and divides them into two lines feeding

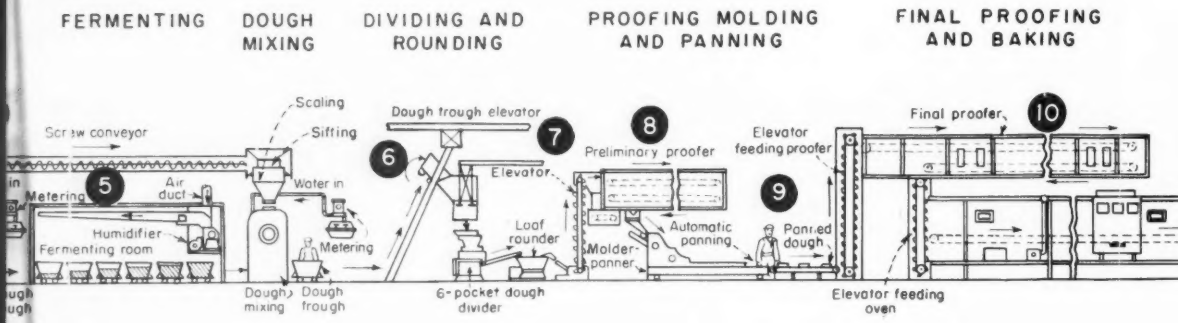


oist (rear) lifts trough over

5 **SPONGE** ferments 3½ to 6 hr. in this sanitary, tile-walled room, where temperature and humidity are controlled.



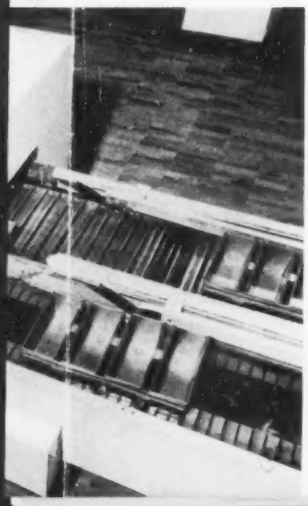
6 **HOIST** elevates and dumps troughs of doug dough into loaf-size pieces, six at a time.

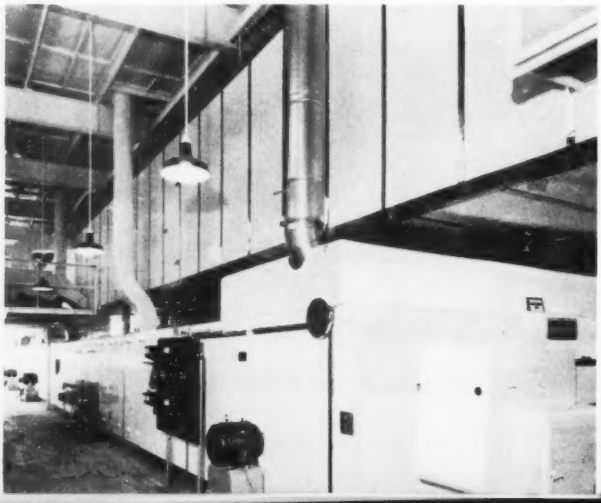


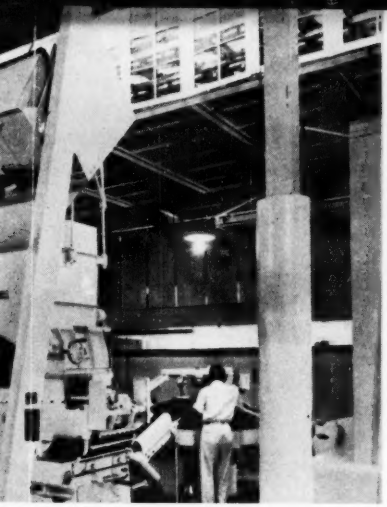
akes pans returning from depanner eeding molder-panners.

10 **FINAL PROOFER** (top) automatically loads pans of dough into oven (below) by electric-control hydraulic pusher bar.

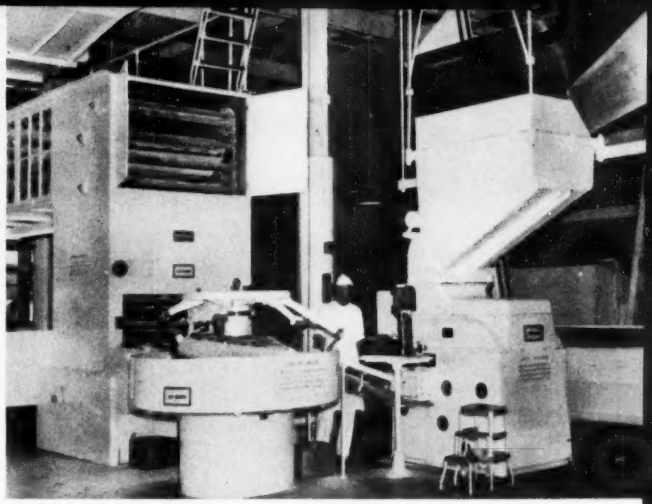
11 **COMING** out of tun (B), and pans to en







ths of dough into divider that automatically cuts at a time.

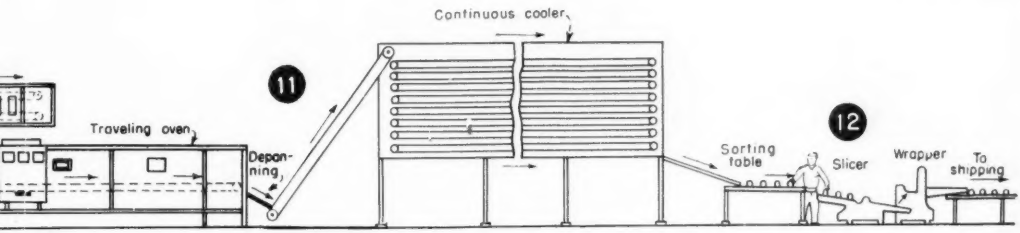


7 **FROM** divider (right), dough goes to loaf rounder, where it emerges as balls, which are then chuted to proofer (left).

G

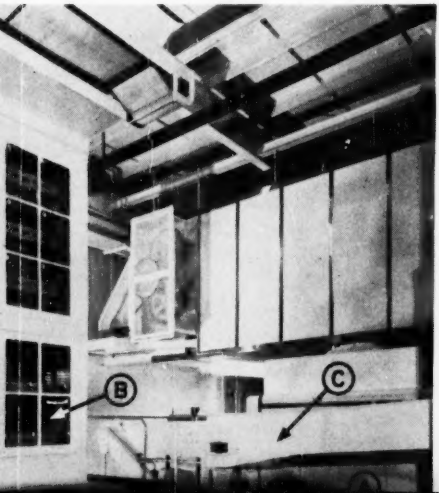
COOLING

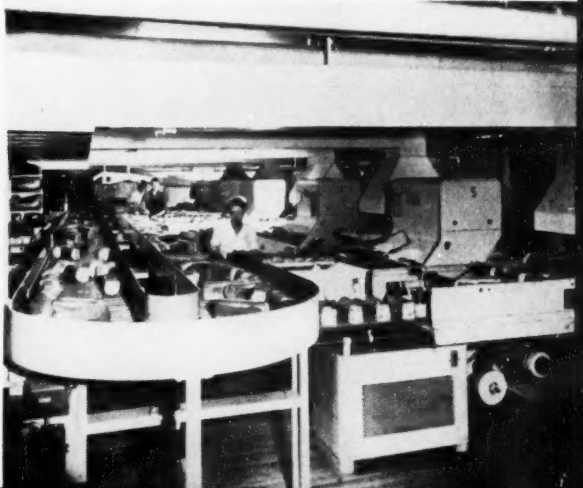
SLICING AND WRAPPING

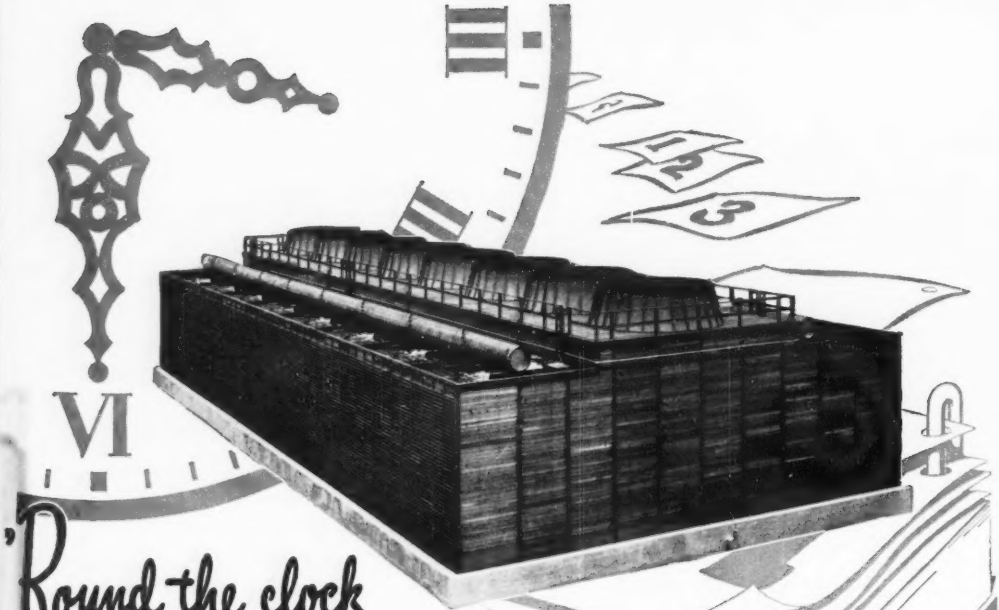


out of tunnel-oven (A), bread goes to traveling cooler pans to enclosed return conveyor (C).

12 **COOLED BREAD** is fed from merry-go-round traveling table (left) to automatic slicing-wrapping machines (right).







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and through the years...

Marley Double-Flow

COOLING TOWERS do their job ceaselessly . . . effortlessly. Designed for long-service life, Double-Flow dependability is further assured by the patented design that makes possible "at-a-glance" inspection, on-the-spot maintenance—all without service shutdowns or lag in plant production.

The famous Marley open distribution system keeps the operator informed at all times on water conditions, and may be cleaned in minutes, during operation. By merely opening a door, the operator can walk through the entire tower, inspecting all essential parts as the Double-Flow continues to do its duty.

Marley fans, Geareducers, drive shafts—all designed for cooling tower service exclusively—are keyed to this same service simplicity. Mechanical equipment . . . distribution . . . filling . . . basin . . . from top to bottom and side to side, Double-Flow towers and *only* Double-Flow towers are an open book to the tower operator—a book that tells a story of ceaseless, effortless operation.

The Marley Company, Inc.
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MARLEY

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PROBLEM: T
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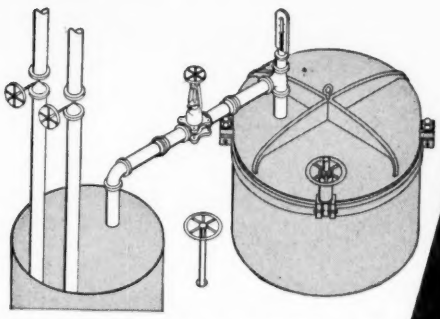

The Installation—Phoenix Dye Works, Chicago, Ill.

OBLEM: To find a durable replacement valve for dye line package dye machine. Various cocks and valves tried, last- only a maximum of 1 to 2 months, with much leakage, cking, and maintenance.

ORKING CONDITIONS: Valve almost constantly in con- t with varying acid dye solutions, at temperatures ranging m 50 to 210 degrees F. Operated about 100 times daily, en with disc in throttling position.

LUTION: Crane No. 18850, all 18-8 Mo Stainless Steel g Gate Valve.

SULT: User reports: after more than 3 years' uninterrupted vice, no leakage through valve . . . no sign of corrosion . . . maintenance expense . . . unusually easy operation. Enthu- stic about performance of Crane Plug Gate Valves.

Another typical example of the long life and low-cost upkeep that ne Quality Valves are famous for. And that's why . . .

More CRANE VALVES are used than any other make!

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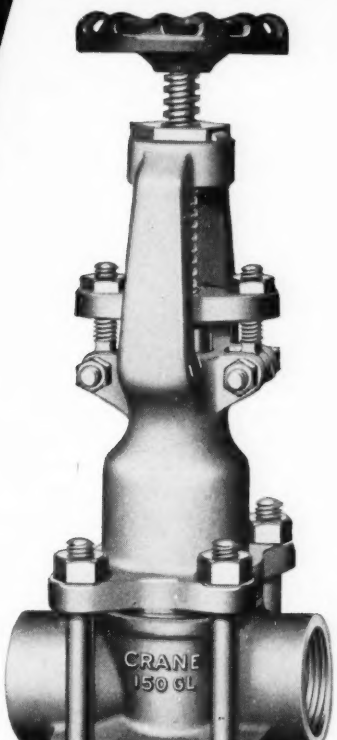

No. 18850 Crane 18-8 Mo Plug Gate Valve for throttling or full-flow service. (No. 17750 in Monel.) Send for new folder AD-1855.

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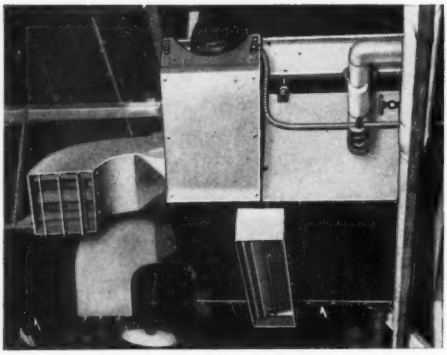
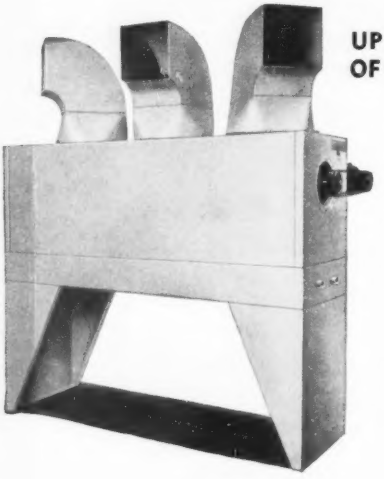
QUICK HEAT FOR SMALL AREAS!

Plan now to wipe out any chilly areas that cramped production last winter. "Buffalo" Breezo-Fin Heaters are very easily installed in suspended position. They operate efficiently on as little as 2 lbs. steam—are available in 20 sizes—have quality Aerofin heater element for maximum radiation and "Buffalo" Breezo Fan for positive heat throw. Now is the time to write for Bulletin 3137-D for the facts!





UP AND OUT OF THE WAY!

Another space-saver is the Suspended "Buffalo" Lowboy Heater, here supplying fresh, filtered, heated air to an entire room. This window installation is ideal in supplying makeup air for plants using large-capacity exhaust systems. Unit has high-efficiency non-corrosive Aerofin heater element and "Buffalo" mixed-flow fans on hollow shaft.

TO HEAT LARGE FLOOR AREAS!

The compact Highboy Heater, with readily adjustable outlets for louvers or duct connection, is simple to install as are all "Buffalo" Unit Heaters. Unit shown is equipped with by-pass damper and the same efficient coils and fans as the Lowboy above. Arrangements and combinations to fit *your* layout. Plan *now* for next winter—write for Bulletin 3704!

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We Mobilize for Freedom

CONTROLS . . . A Two-Edged Sword

It may seem dangerously premature to talk about getting rid of emergency government controls while all-out war is still an imminent possibility.

But success in this strange struggle for our freedom into which the Russian Communists have plunged us requires that we:

1. Maintain a whole battery of controls designed to speed defense production and curb inflation, and at the same time

2. Work to end the controls at the earliest possible moment.

Here is the reason why this editorial—fourth in a special series on mobilization for defense—is devoted to the need for a speedy release from controls.

If the Russian Communists can force us to maintain indefinitely the present system of government controls, they will have won a tremendous victory. They will have saddled us with a system of collectivism which, over a period of years, would be fairly certain death to freedom of business enterprise.

Make no mistake about it. This is not an argument against emergency controls. We need controls now to break a right of way for our mobilization program through the business boom. Indeed, the third editorial in this special series was titled "Why Controls Are Necessary." It stressed both the need for controls and the need for positive cooperation to make them work.

Controls Can Undermine Our Economy

But these controls surely chisel at the foundation of our normal economic system. So long as we have them, many if not most key business decisions will be made in Washington bureaus rather than in the free market place. For example, the *National Production Authority* administers a *Controlled* Materials Plan (italics ours) which directs the flow of basic metals, and decides who can use them for what purposes.

Happily, the people who operate these controls are not using the methods of a secret police state.

Even more happily, most of the leaders who have been drafted to manage the controls are not in love with their jobs. They are doing their best in the thankless task of making controls work. They recognize the danger of chronic controls.

But the fact remains that our economy is

operating under arrangements which carry it a long way toward the pattern of centralized control the Russians would inflict on the world.

The Wilson Plan

A plan for getting rid of these controls has already been developed. It was put together by our Director of Mobilization, Charles E. Wilson — while he was working day and night to set up the necessary emergency controls.

The Wilson Plan — if we escape all-out war — will strengthen our defenses and our economy. By 1953, it calls for:

1. Providing the weapons to equip an armed force of 3½ to 4 million, together with a supply of weapons for our allies.

2. Building a stockpile of weapons which, with current production, would be sufficient to carry on an all-out war for a year.

3. Building the manufacturing capacity by which we could rapidly expand our production of weapons if all-out war should come.

4. Increasing the productive capacity of industry enough to resume the expansion of our civilian economy.

With these jobs done our economy would be big enough and strong enough to meet both civilian and military requirements. And the government controls needed for mobilization could be speedily dropped.

Call for Sacrifice

The Wilson Plan requires a major effort — it means spending more than $50 billion a year for mobilization. That is almost 20 percent of our total production. And this cannot be done without sacrifice. For a time, particularly in the next year, living standards will drop.

But the sacrifice required is amazingly small. At the peak of the defense effort, civilians will still have available to meet their needs about as much as they did in any year before 1948.

To make the Wilson Plan succeed we must curb inflation. A second year of inflation such as that which we have had since the Korean war started would multiply disastrously the costs of our defense program. One key part of a successful program to curb inflationary pressure, which soon will be building up again, is a pay-as-we-go tax program. The second editorial in this series urged that we do our utmost to pay as we go.

We Cannot Out-Control the Communists

But, above all, to make the Wilson Plan work we must keep our sights set on the crucial importance of increased production. Our problem is to increase our capacity to produce so that we can carry both a major military program and an expanding civilian economy for as many years — General Bradley thinks it might be fifteen or twenty — as the menace of Russian Communist aggression persists.

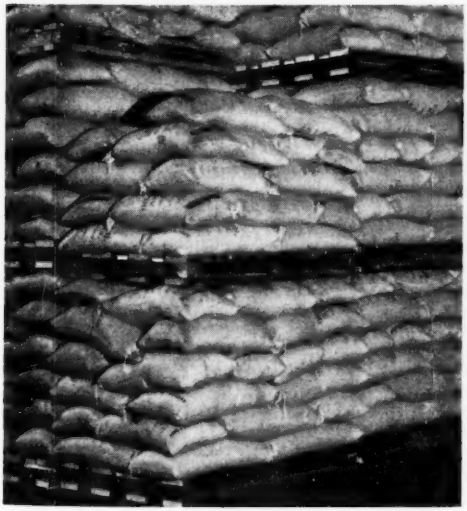
If we do not produce enough to do this double job, we shall be confronted with the prospect of having to live indefinitely under government controls of the sort that have been set up since the start of the Korean war. That would be delightful to the Russian Communists. It would go far toward making over our economy on the Moscow model.

Even if we wanted to, we never could hope to out-control the Russians. They are miles ahead of us in that line. But we can out-produce them, by a tremendous margin. By doing that we shall travel the surest road to victory.

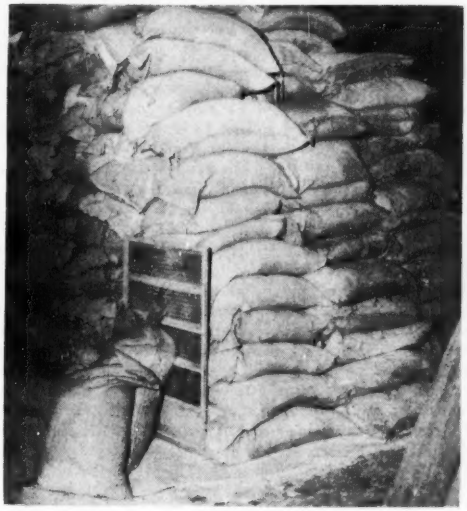
McGraw-Hill Publishing Company, Inc.

Proper Storage Is Vital

RIGHT WAY: Protects materials



"ANY WHICH WAY": Attracts rodents



7 STEPS
To Effective Plant Sanitation

Management can assure itself of top quality ingredients and products by careful implementation of these practical housekeeping suggestions

JAMES J. WINSTON

Director of Research National Macaroni Manufacturers Assn., and Director, Jacobs-Winston Laboratories, Inc., New York

Continued profitable operation of your food establishment requires that the products be received, processed and maintained under conditions which will assure the public that they are clean, wholesome and appetizing. **It is, therefore, incumbent upon management to effect a policy of good housekeeping in order to exclude those elements that are obnoxious and repulsive.**

The owner of the plant should consider it a personal obligation to see that a competent executive—specifically one well informed and trained in sanitation—is placed in charge of this most important phase of food processing. This responsible party should be a sanitation expert with a knack for being practical in reporting his recommendations to management. His suggestions should be a matter of record so that the owner will always have the facts at his disposal.

A survey of the plant's sanitary status, whether done by an employee of the company or an outside consultant, is of first importance in the realization of effective housekeeping. The report of this inspection should reveal certain pertinent facts, and then follow up with recommendations for improvements in plant and housekeeping. Then you have the basis of a sanitation program that includes these seven practical steps:

1 *Make sure your plant is structurally okay.* A detailed report should point the way for management to carry out the necessary improvements so as to comply with sanitary regulations. All places that might support rodent and/or insect life should be determined and remedied. Open spaces in walls, around pipes, dead corners, ceilings, and wall-floor intersections should be properly caulked, using either a special caulking compound, plaster, cement mortar or sheet metal, as the case may be. Further, all needed repairs should be made to prevent ingress and egress of pests and to make the building rodent proof.

2 *Exert care in cleaning machinery,* with precautions taken to eliminate accumulation of dust and grime in dead spaces. Machine parts should be vacuumed frequently, since the settling of dust, particularly flour dust, will in time cause formation of larvae and adult insect life.

3 *Check personal hygiene of employees,* with emphasis on the availability of clean toilets, paper towels, hot water and soap. It is also advisable for girl workers, especially packers, to wear hair nets to prevent any hairs from falling into the packed product.

4 *Arrange for exterminating service,* to help eliminate pests. The exterminator should operate on a weekly basis, and he should cooperate closely with the sanitation adviser. He should pay special attention to all vulnerable and critical areas.

5 *Handle and store raw and finished goods properly.* All raw materials and packed goods should be stored on skids that are placed at least 18 in. away from the walls to prevent harborage of pests. Wooden structures, such as flour elevators and bins, should be replaced by metal ones, preferably of stainless steel, with a minimum of seams.

6 *Use non-toxic insecticides* to supplement work done by the hired exterminator. Management should be advised as to the relative merits of different insecticides, their toxicities and limitations. Use of toxic poison should be discouraged in a food plant to avoid product contamination.

7 *Insist upon "wide-awake" porter service.* This service, under proper guidance, is a prime necessity. The porters should be instructed by the sanitation consultant and directed to do a thorough job cleaning both behind and under equipment and materials. The necessary tools, especially an efficient vacuum cleaner, will make the porter's job function efficiently. It is often advantageous to map out a specific sanitation program that keeps the workers posted as to their duties on a day-to-day basis. This makes for a thorough job.

It is also advisable to supplement the sanitation consultant's services with the chemist's microscopic examination for foreign matter. It is the responsibility of the processor to be selective in purchasing his commodities so as to make a product with a minimum of insect fragments, and no rodent matter. Therefore, comparison of the condition of the raw material with the finished goods will serve as a sanitation index.

In general, the finished goods will contain approximately the same amount of insect fragments as the raw material, although in certain types of processing there may be a slight increase due to mechanical breaking of insect fragments. However, a slight increase in these fragments will generally be indicative of good sanitary processing conditions, while a definite increase of foreign matter in the finished product will show unfavorable sanitary conditions in the plant.

The finding of abnormal amounts of foreign or rodent matter in the raw material should be sufficient cause for the manufacturer to reject the merchandise. Constant and periodic microscopic examinations of these materials will build up a file showing sources of any contamination. Management, with the proper data, can thus be more discriminate in the choice of suppliers and, at the same time, avoid possible conflict with the law.

Processors of cereal products will find it to their advantage to make careful checks of all cars of farinaceous material received. Each car of flour should be inspected upon arrival, and particular attention should be paid to the car's interior, after it is unloaded. This is one criterion for determining whether the raw materials are arriving under good sanitary conditions. Sometimes, such an inspection will reveal contamination.

Use of old wooden equipment will often contribute directly to the breeding and harborage of pests. Wooden table tops will often prove a focal point for development of insects despite proper porter service. It is imperative, therefore, that such tops be replaced with metal.

In canning factories, use of pitted kettles or old wooden paddles will also be conducive to a high bacterial content in the product. Any equipment tending to conceal microorganisms because of deterioration should be immediately replaced.

Management will sometimes be perplexed to find that, despite all precautions, some rodents manage to get into the plant from the outside. Elimination of rodents outside the plant must be resolved into a community affair wherein each member does his part in carrying out a sound sanitation program. However, a fundamental policy in each plant should be to ascertain that all doors leading to the street are constructed or repaired so as to come flush with the floor or ground in order to prevent the coming and going of rodents. This kind of alertness will pay dividends to every processor.

Legal aspects of sanitation will be considered in a forthcoming article co-authored by J. J. Winston and his brother, Joseph Winston, Member of the New York Bar.

—End—

Nylon Is Answer

—Continued from page 52

in bins running anywhere from "shorties" up to 160 ft. in height. Simple airplane type connectors were used to allow easy linkage between suspended cable and nylon covered leadwire running to the temperature reading station.

Finally, grain forces in various size bins were estimated and suitable cable-suspending clamps were developed that were also simple to install.

Result of this thoughtful development program is a versatile thermocouple cable assembly that can be readily applied to all type of bulk storage structures.

Consider a typical installation:

A country grain elevator with ten 120-ft. concrete bins requires ten 18-thermocouple nylon scanning cables—measuring points then being at 6 ft. intervals in each bin. The cables, with their built-in steel support wires, are suspended by a suitable clamping device from the concrete bin tops.

The thermocouple wires from each cable terminate in an aviation type plug which fits an 18-' couple leadwire receptacle. Lead wire cables, each readily detachable from the system, are bunched and run to a centrally located temperature-reading panel.

At the panel—which can be located atop the elevator or below in the superintendent's office—all leadwires from the bins funnel into a switching system, one multiple switch per bin.

A motor-driven electronic potentiometer gives the readings. As the bin switch (or pushbutton bank) is moved by the operator from one grain level to another, the instrument scale will immediately rotate to a new temperature reading should an abnormal condition be uncovered.

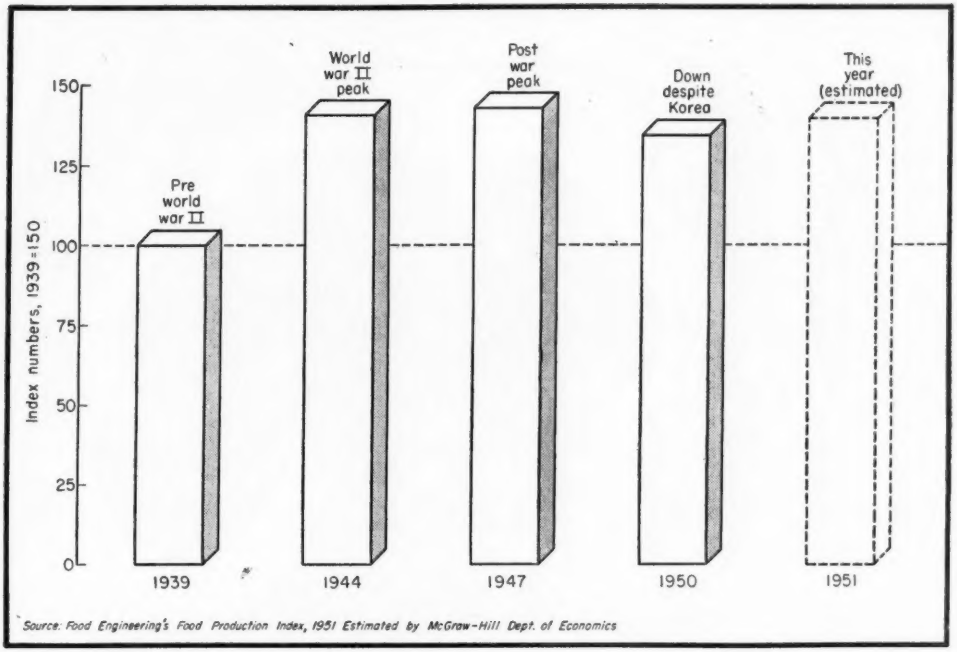
The simple whirr of a potentiometer balancing meter, actuated by a hot area in the grain, is the danger signal. This "hot-spot" is then carefully checked over a period of time. Any ascending trend in temperature is the cue to "turn" that particular bin and forestall almost sure losses.

There is no restriction to the number of bins that can be scanned from one central reading station. However, there is a limit in the number of switches that an operator can handle while still viewing the instrument dial. When facilities run to over 100 fairly tall bins, it is desirable to set up two panels and associated switches.

The speed of this scanning system is notable. For example, the 10-bin installation described can be checked—all 180 temperature points—in less than 4 min. A thousand-point installation would only require a 20 min. daily check—small time and effort for guarding what could be over a million dollars worth of grain.

Since its inception, over a year ago, the new nylon cable system has been cautiously installed in over 30 locations. Experiences, thus far, have all been positive and point toward much wider use of this technic.

Production On Higher Plateau



Source: Food Engineering's Food Production Index, 1951 Estimated by McGraw-Hill Dept. of Economics

Why Output Will Go Up

With prices relatively stable while costs continue to pinch, processors must rely on volume to overcome shrinking margins through balance of '51

VOLUME is a key word for the food industry in the second half of 1951 —for volume of output will in many cases make the difference between profit and loss.

Here's why: Prices are fixed. Lots of costs—labor, freight rates, other overhead items—are still going up. So margins are squeezed. And when profit per unit is less, the only way to keep profits up is to sell more units.

Well, what's the outlook?

■ **In the food field overall, it's good. Processed food output for the calendar year 1951 will be well ahead of last year. In fact, total volume should be the highest since the all-time peak set in 1947.**

Three factors point to a big volume year:

1. *Consumer demand.* There's more income available to buy food than ever before. Consumer income after taxes was up 10 percent from last year, according to the latest count, and still rising. Less of it will be spent on hard goods, like automobiles, this year. The fixing of prices means many families will be able to increase their actual consumption. This applies especially to the nourishing but expensive foods like meat and milk.

2. *Military demand.* The services will take large quantities of canned meat, fruit, vegetables, and combination items.

3. *Large crops.* The official Department of Agriculture forecast is for near-record crops overall and very large supplies of livestock products.

Commodities Will Vary

But volume won't increase by the same amount in every line. Some plants have been running at capacity right along. Some distributors have been piling up inventories. Individual crop prospects differ. Consumer demands are changing. So here's the outlook by branches of the industry—

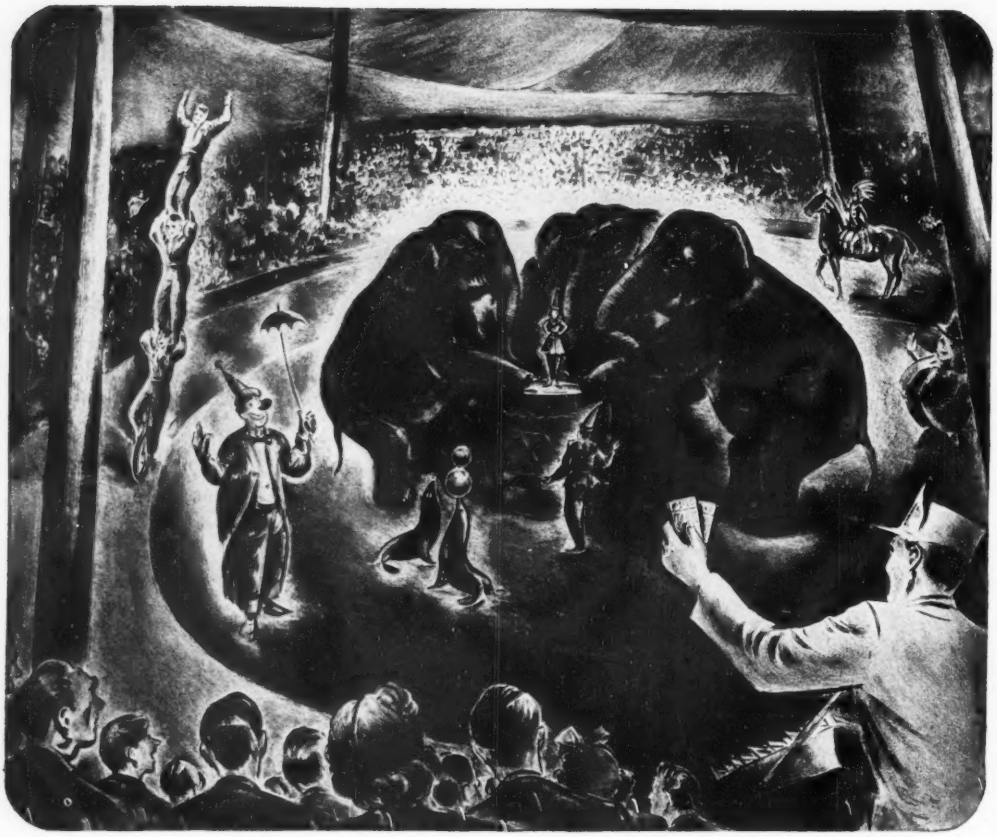
Canning: Volume here depends on two factors—Weather and labor. Thus far, weather has been favorable for fruit and vegetable crops everywhere but in the Pacific Northwest. Industry and government experts are confident that enough labor can be recruited to meet the fall rush.

Crops Are Ample

Enough acreage is under contract to provide a 15 percent, or greater, increase in the 1951 vegetable pack, and perhaps as much in the fruit pack, if the labor and weather factors work out.

Although there are considerable inventories of canned goods held by

(*Turn to page* 119)



AN ORIGINAL LITHOGRAPH BY HENRY E. WINZENRIED

"PEANUTS . . . POPCORN . . . POTATO CHIPS"

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Use the Fats That Fit Your Mixes

Through care in selection of shortenings—particularly in the matter of proper antioxidants—you can avoid rancidity, flavor reversion, product discoloration, fat hydrolysis, and poor baking qualities

GEORGE T. CARLIN
Swift & Co., Chicago

The fact is that prepared-mix makers must approach their shortening problems in a different manner than do the bakers.

■For in the cake-mix business, there are specialized problems that demand specialized answers.

Let's look at the picture:

Shortenings for prepared mixes are now principally made from lard and the vegetable oils (soybean, cottonseed, and peanut), with a great degree of interchangeability between them. From these raw materials, almost any type of shortening can be made—those varying in hardness, plasticity, keeping quality, creaming ability, dispersing property, and air-retention value. Moreover, a final product can be standardized and, through proper refining and hardening techniques, a common end-point can be approached.

However, in doing this, certain weaknesses must be recognized. For example, when using lard as a raw material, we know that it lacks resistance to rancidity. There is also another weakness in lard as a raw material: It will produce a crystal structure that is unsuited for cake mixes, but which might be especially well suited for pie mixes.

It was believed that something in the lard caused it to go rancid. Later it was learned that something in other fats, and not in lard, caused the rancidity. However, with the development of antioxidants, the occurrence of rancidity, when using lard as a raw material for making shortening, completely disappeared.

Flavor Reversion

There is another raw material problem: The fats and oils chemists have not completely succeeded in blocking the flavor reversion properties of soybean oil. Much progress has been made curbing flavor reversion during the last 15 years. However, there is still a possibility that shortenings made from high percentages of this ingredient will at some time between production and consumption take on a metallic and unpleasant taste.

To some people, this taste is as bad as a rancid one. Therefore, from a flavor standpoint, the use of soybean oil will cause certain restrictions that should be considered by the mix manufacturer aiming for a product with a shelf-life of 6 months.

Cottonseed oil has no hidden weaknesses. It can be used to make shortenings that have good stability and do not revert in flavor. The same is true with peanut oil. So, within the limitations mentioned, these oils should be considered interchangeable by a scientist working in the fats and oils field, because they open a much broader base from which to purchase fats.

Now let's go back to the stability problem associated with lard. We pioneered work on antioxidants by applying them to large scale manufacture and obtaining approval from the Meat Inspection Division for the use of the first recognized antioxidants.

That original antioxidant was gum guaiac. It was used to increase the stability of lard. Gum guaiac will carry through fairly well in bakery products such as crackers. But it is now outmoded among the antioxidants because there are many more that are far more effective.

Mix Turns Purple

There is a particular disadvantage in using gum guaiac, and some of the other antioxidants, which is of primary importance to mix manufacturers: When used as a test reagent for determining the presence of peroxidase catalyst enzymes, it turns purple. To the dismay of those who add gum guaiac to prepared mixes, the peroxidases and catalases in the flour can cause this antioxidant to turn purple right in the mix as soon as moisture is added. One can well imagine what would happen if pie-crust mix started getting purple when the housewife prepared the dough!

Now, going one step further, propyl gallate is considered an extremely potent antioxidant. It does not carry through into the baked products, but it will keep the fat fresh. It, too, is subject to color reactions. In the presence of egg yolks, propyl gallate turns green. And in the presence of iron it turns black. So propyl gallate should be looked on with suspicion, particularly by those planning bulk handling and storing of fats in iron tanks.

N.D.G.A. is another popular antioxidant that will boost the resistance of fats to rancidity, particularly those from animal sources. It, too, will undergo color reactions.

Butylated hydroxyanisole (BHA as it is so commonly called) is perhaps one of the most powerful of the commonly used antioxidants. It not only will stabilize fat in the package, but it also carries through into baked products very well. So, BHA is of interest not only to mix makers, but also to soda cracker and cookie bakers. It does not undergo color reaction. However, it has a limitation—its rather pungent taste. So any intention of just "plugging" a mix with BHA should be questioned.

The quantity of BHA used in fats and shortenings is controlled by the Meat Inspection Division, and the mix manufacturer who throws in another dose should be very careful in watching for flavor problems, if the BHA type is used.

Other Antioxidants

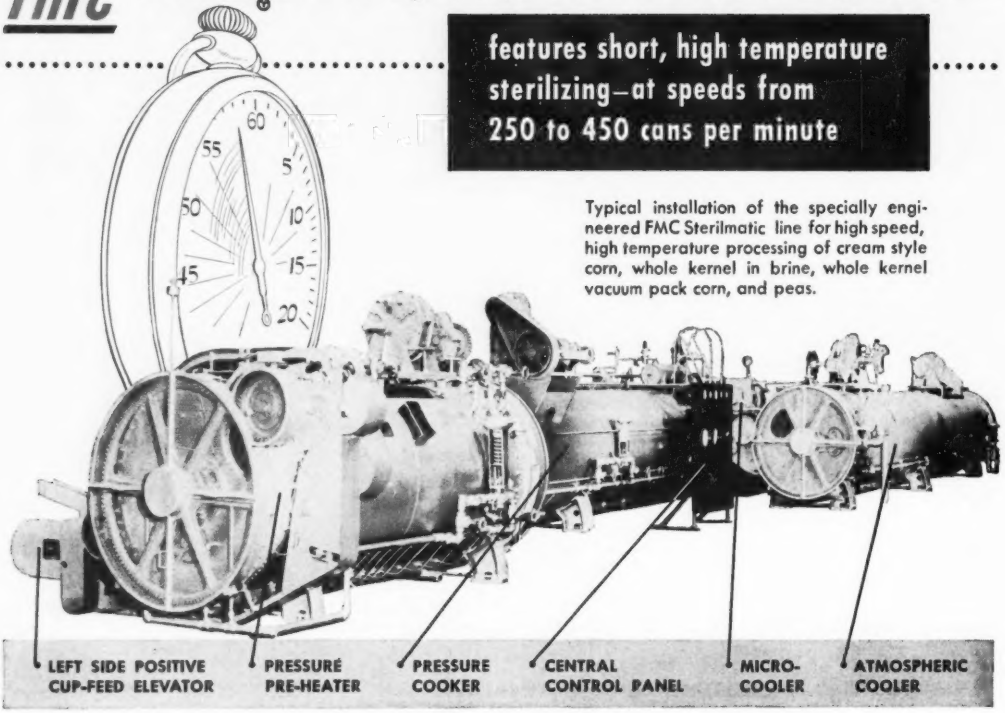
Of course, there are some acetic type of antioxidants—perhaps not antioxidants at all. For example, citric acid is sometimes helpful in preventing flavor reversion in soybean oil. Citric acid works synergistically and blocks color reactions from other antioxidants. Phosphoric acid acts the same way.

There are still other antioxidants. Lecithin is a fairly good natural one. It is not effective in vegetable oil shortenings, but it has some effect in animal-fat shortenings. Lecithin has

(*Turn to page* 155)

fmc STERILMATIC EQUIPMENT FOR CORN AND PEAS

features short, high temperature sterilizing—at speeds from 250 to 450 cans per minute



Typical installation of the specially engineered FMC Sterilmatic line for high speed, high temperature processing of cream style corn, whole kernel in brine, whole kernel vacuum pack corn, and peas.

Built in sizes, types and arrangements for every need

Handles various can sizes:
Flexible new FMC Pressure Cookers handle various two and three can combinations, including 307 x 409 and 303 x 406 sizes, with only slight modification.

Same equipment for many products:
Designed for maximum versatility, Sterilmatic lines are processing cream style and whole kernel corn, peas, green beans, and virtually all other canned products.

Every can cooked exactly alike:
Not only is every can cooked alike, but each can is *evenly* cooked, through fast, uniform heat penetration.

Processing costs greatly reduced:
Minimum space, time and manpower requirements result in major savings with the "One-man cook room." Steam savings alone often reach 60% or more.

You get a superior quality product:
Controlled Sterilmatic processing avoids losses from over or undercooked batches, assures improved product flavor, better color and appearance.

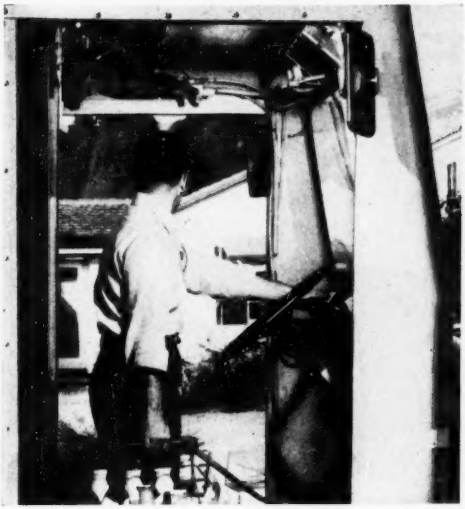
Write for free booklet which fully describes The FMC STERILMATIC Process for cream style corn. Contact your FMC representative for information on this and other continuous pressure cookers and coolers.

First in Diversified Food Equipment

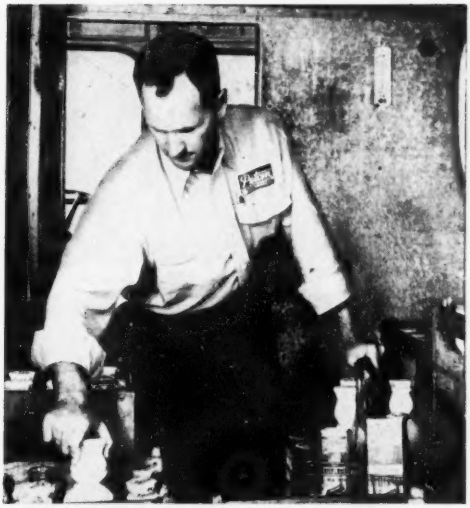
FOOD MACHINERY AND CHEMICAL CORPORATION
Canning Machinery Divisions

General Sales Offices:

EASTERN: HOOPESTON, ILLINOIS **WESTERN:** SAN JOSE 6, CALIFORNIA



DASH SWITCH is set to automatically close refrigeration door while driver goes on his way with milk delivery.



AMPLE HEADROOM in refrigeration area, plus automatic door from driver's compartment, save delivery time.

Pushbutton Truck Door

Steps Up Milk Deliveries

West Coast dairy saves as much as one hour per day per truck with automatic door-closing device and more readily accessible refrigeration area, sparing route drivers many "lost" motions

PLATE TYPE refrigerated bodies and mechanically opened and closed cold compartment doors feature the fleet of eleven retail milk route trucks operated by the Petan Dairy Farms in Santa Barbara, Calif.

■ **Each mechanically-operated door saves each truck driver 1 hr. per day —worth $1.87. On a 6-day week basis this adds up to $583.44 for a 52-week year.**

With Santa Barbara's moderately high and even temperature throughout the year, the plate-refrigerated body keeps the milk, cream and other dairy products at approximately 35 deg. F., no matter what the outside temperature or the length of the route may be.

The base vehicle on which this unusual body is mounted is a Dodge step-in drive chassis with a panel type closed body insulated all around—roof, sides, ends and floor. An insulated transverse bulkhead or partition directly to the rear of the driver's position forms the front end of the refrigerated compartment.

The refrigerated compartment has sufficient headroom for the driver-salesman to stand up inside it while filling his wire basket with the different items for each route stop. There are two cold plates in each compartment, one on each side.

The compartment is loaded through a rear door and unloaded through a front door directly in back of the driver's steering wheel. It is this front door which is mechanically operated.

The cold plates are of the ammonia type, serviced from the dairy's main refrigeration system. Every night, plant ammonia is circulated through a coil in each of the plates, freezing a solution contained in the space between the coil and the shell of the plate.

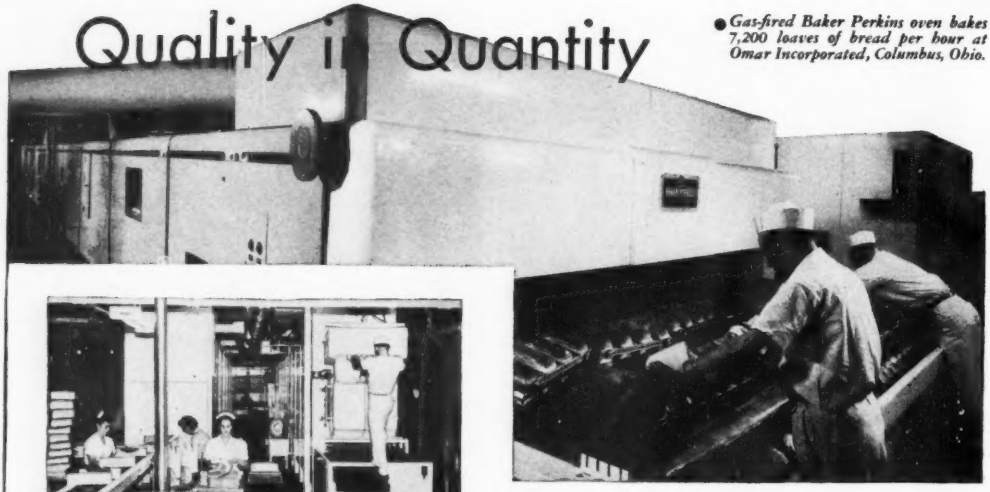
Refrigeration is provided by the action of the solution thawing out during the day. This thawing is due to the door openings but takes place at a predetermined rate, thereby maintaining the desired temperature during the delivery route period.

Clear Exit

The driver's seat is attached to the outside surface of the front refrigerated compartment door.

Thus when the door is mechanically folded open, the left side of the driver's compartment near the steering wheel is unobstructed, permitting the driver to get off the truck, with the items to be delivered, before the refrigerated compartment door is closed. The driver's easy egress from the truck is further aided by the fact that the lefthand opening to the driver's compartment is door-less. However, a folding-type hand-operated door is fitted at the right of the

Quality in Quantity



● *Gas-fired Baker Perkins oven bakes 7,200 loaves of bread per hour at Omar Incorporated, Columbus, Ohio.*

● *720 dozen doughnuts an hour are formed, proofed, fried, glazed and cooled in this Gas-fired machine, manufactured by the Doughnut Corporation of America, New York.*

- **BREAD AND ROLLS**
- **PIES**
- **DOUGHNUTS**
- **CAKES**

from GAS Baking Equipment at OMAR Incorporated

QUALITY in QUANTITY GAS BAKING is typical of the Columbus, Ohio, bakery of Omar Incorporated, Omaha, Nebraska. The continuous, automatic production-line methods of Omar highlight the versatility and effectiveness of GAS baking for speed and quality.

Modern Gas Baking and Frying Equipment helps produce

- **7,200 loaves of bread per hour**
- **720 dozen doughnuts per hour**
- **500 eight inch pies per hour**
- **2,340 layer cakes and 10,000 cupcakes per hour**
- **plus large quantities of sweet and plain rolls.**

Baking temperatures obtained with GAS are precise and easily controlled. Gas is clean, economical, and completely adaptable to all baking requirements.

Whether your baking volume is large or small, Gas baking gives the speed and precise temperature control needed to make your bakery goods the best possible, as at Omar. Get the facts today from your Gas Company Representative.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL COMMERCIAL COOKING

driver to close in that side when desired.

The purpose of the operating mechanism to open and close the door of the refrigerated compartment is to speed up the driver's delivery time and make it comparable with that on a conventional, non-refrigerated milk route truck. With the latter truck, the driver has only to select the items for the next delivery from inside the body, step down and out through the lefthand opening of the compartment and be on his way to the customer's doorstep.

But without the automatic feature of the door to the refrigeration compartment, he would have to take time to open and close the door between each delivery. This has been avoided by the special mechanism, now in service for more than two years.

Combined Unit

The mechanism comprises a combination vacuum-electric unit consisting of a vacuum cylinder, linkage rods and parts, and an electric operating circuit controlled by a toggle switch located on the truck dashboard. The actual door-operating members are located out of the way on the ceiling of the driver's compartment.

The unit was jointly engineered by Petan Dairy Farms and the manufacturer, the Smalley Body Works, Oxnard, Calif. Installation cost per truck was approximately $250.

In operation, when the driver stops to make a delivery, he turns the dash toggle switch to the opposite position to that in which he found it. This automatically opens the refrigerated compartment door, and he then proceeds to the inside of the compartment itself.

After he has filled his basket with the proper items, he steps out through the open door to a position in the driver's compartment to the left of the steering wheel, moves the dash toggle switch to its opposite position, and gets off the truck while the refrigeration door is closing.

—End—

Bulk-Food Warehouse

—Continued from page 48

It falls off the conveyor belt into the bottom of this tower and is picked up by a pivoted bucket elevator (Link-Belt Peck carrier) which elevates it to a belt conveyor enclosed in a gallery 85 ft. above the street that separates warehouse and cutting-in station from the refinery. Its destination, on completion of the company's present program, will be a surge bin atop the new affination and carbonation building.

When the refinery is not in need of raw supply, the sugar is shunted from the east-west belt conveyor to a southbound belt that takes it to the warehouse. This belt is inclined at a 14 deg. angle, and it is enclosed all the way from the roof of the cutting-in station to the roof of the main warehouse. It elevates the sugar to a point at the apex in the center of the warehouse.

Entering the warehouse through the roof at mid-point, sugar drops on a shuttle conveyor belt which is 66 ft. above the floor. This carrier is mounted on tracks arranged so the sugar can be dumped at any point on the floor. Sugar is deposited in a long pile.

The heavily reinforced concrete floor, supported by 2,200 concrete piles, is designed to carry the load of maximum storage and is paved with 1½ in. of sheet asphalt containing siliceous (non-limestone) aggregates to avoid concrete corrosion.

Manner in which raw sugar is moved from warehouse to refinery is unusual. Along the length and center of the warehouse floor there are 20-in. sq. slots spaced approximately 12 ft. apart. There are a total of 42 of these, each equipped with manually operated sliding control gates. When opened, they will permit the sugar to flow from the warehouse to a belt conveyor in a tunnel below.

Terminus of this belt conveyor is the tower at the north end of the warehouse, where sugar drops into a disintegrator within which are four rotating shafts from which 1-in. pins protrude. These pins mesh when the shafts are rotated so that as the sugar passes through any lumps are reduced to less than 2 in. dia. Sugar is then picked up by the 85-ft.-high Peck carrier elevator, previously mentioned, and travels through the overhead gallery and into the affination and carbonation building.

To supplement the natural gravity flow of the sugar through the floor openings, a rubber-tired tractor with a special bulldozer blade is used to push the sugar into position above the openings.

A small rubber-tired sweeper (18 hp. with a 4-ft. rotary brush in front, and employing a 9 cu. ft. vacuum tank) recovers sugar that is passed over by the bulldozer. This unit also keeps the warehouse floor free of sugar.

This warehouse, now finished, represents only a part of the company's expansion program. Upon completion of the full project, output of the plant will be upped from the current average of 1,600,000 lb. to 2,500,000 lb. (melt) per day.

To execute the large scale modernization program, which had been given considerable initial study by C. & D. officials, F. H. McGraw & Co., of New York City, was engaged. To this firm of engineers and constructors went a three-fold job: (1) to survey C. & D.'s plans and, where indicated, suggest alternatives; (2) to blueprint a final integrated plan; (3) to devise the best means of translating this plan into actuality.

Initial project was the erection of new facilities for the handling and storage of raw sugar (detailed above). Second part of the program—construction of the affination and carbonation building—is now in varying stages of completion. And the third part—engineering of a new char house and other facilities—has also been initiated.

The fully completed modernization program will represent an expenditure of several million dollars.

The company's new affination station will replace the present depleted equipment. Instead of locating this station at the raw storage shed, as is customary, it is going up alongside the refinery building. This facilitates the gravity flow of sugar and eliminates a long transportation of sugar liquors, affination syrups, and sweet water. It also saves large quantities of steam and electric power. Simultaneously, it was decided to install a station for carbonation of washed sugar liquor.

By combining these two stations in one building, it was possible to utilize the existing space adjacent to the present refinery building. This space was rather narrow—25 ft.—and because requirements dictated a height of over 140 ft., this presented major design and building problems. The building design included a structural steel frame sheathed in corrugated aluminum and lined with a smooth-faced tile.

Weighing Is Automatic, Accurate

Immediately ahead of the affination station, the raw sugar will be weighed into process automatically with an accuracy of 1/10 of 1 percent on a Servo-Balans hydraulically operated batch scale. The affination station will include the Stevens hot mingling system, which will provide considerably greater and more effective washing of the raw sugar than present equipment.

Carbonatation of washed sugar liquors is a relatively new process to the North American cane sugar industry. It is expected that this technic will materially cut char requirements.

—End (Resume reading on p. 49)

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
313 WILSON, SO. NORWALK, CONN.

Why Output Will Go Up

—*Continued from page* 111

distributors, processor's, stock are very low. Hence there is no question about demand for these products. Military set-aside orders and inventory rebuilding will absorb the full increase in output.

Meat Packing: This should be the biggest year since 1947. Per capita consumption is slated to go 2 or 3 lb. higher than in 1950, when it was 145 lb. for each citizen.

Most of the increase will be in pork production, which will show about a 7 percent gain over 1950. Beef production will also show a moderate rise. About 4 percent more cattle were on feed in the corn belt this spring than last. Price rulings will affect the timing of marketings. But is seems clear that they will continue higher than last year for the remainder of 1951. Output of lamb and veal will continue below 1950 figures.

The supply of feed grains and number of animals, both breeding herds and calves for feeding, seems adequate to permit a further increase in beef slaughtering in 1952. And pork output could also rise further, although probably not by the same amount as in 1951. However, the introduction of beef price ceilings has raised the possibility of some meat being slaughtered on the farm, or otherwise diverted from normal processing channels.

Meat By Products: Increased meat output should yield up to 5 percent more lard, tallow and other by products than in '50. The demand for soap, glycerine, and other chemical products made from meat derivatives, is expected to continue very strong.

Dairy Products: Total milk production is expected to run about the same as last year, when it was 120,500,000,000 lb. But more milk is being sold in fluid form. During the remainder of 1951, output of fluid milk, ice cream, dry whole milk, and evaporated milk will probably continue higher than a year ago. On the other hand, production of butter, cheese, and nonfat dry milk solids will be down substantially.

An important factor for the future is the threat of declining milk production in Wisconsin, which supplies a big share of the milk used in making butter and cheese. As in the last war, farmers there are reported turning to other crops promising better profit margins.

Vegetable Oil Products: Production may slow down a bit in the next few months. Consumers have built up substantial inventories of shortening, margarine, and other oil based items. Also the supply of vegetable oils for processing is low because of last year's short crops and the high rate of processing to date.

However, demand should increase in the fall and winter months, as stocks of shortening and other finished products are drawn down. Consumption of these oils, both as ingredients and as retail products, will continue high. And there is substantial export demand at the ceiling prices.

New crops are expected to provide a 5 percent increase in the supply of vegetable oils in 1951-52. Some will be exported. But a 2 or 3 percent gain in processing output seems likely.

Grain products: This is another field where production may level off for a time. In the early months of 1951, manufacturers processed considerably more corn, oats and barley than last year. This has built up inventories of finished products. For example, operations of the wet process corn industry have been running about 18 percent higher than a year earlier.

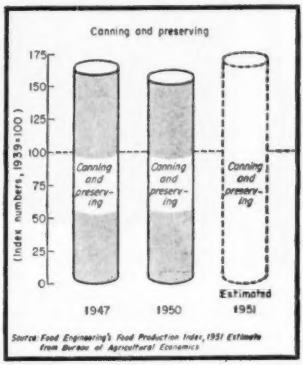
Supplies of these grains have been ample all along. However, some tightening is in prospect unless this year's crops are quite large, because of increased calls for animal feed.

There will be plenty of wheat available to millers. Despite the relatively poor winter crop, the overall situation is still one of surplus. The demand for flour will probably not continue as strong as in late 1950 and early 1951, when there was considerable production for inventory and for nonrecurring export demand.

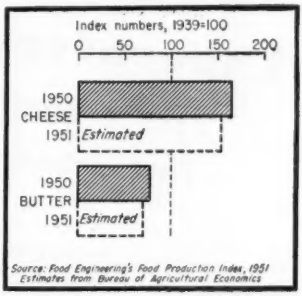
Sugar products: Enough raw sugar is available to maintain consumption at last year's level in the sugar-using industries. Consumer demand for candy, ice cream, canned goods, and other sugar-heavy items, will be as strong or stronger. There will be less inventory demand for refined sugar. Accordingly refining activity will not show the same spurt it did right after Korea. But the present relatively high level should be maintained.

End (*Resume reading on page* 113)

Canners Aim for New Peak



Cheese and Butter Volume Off



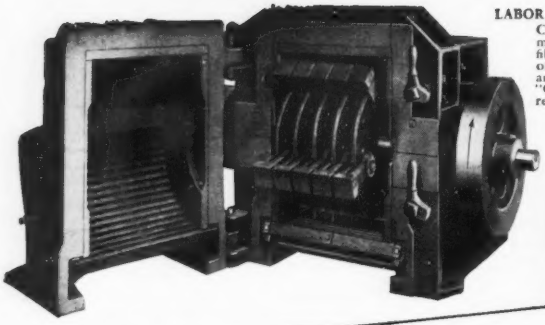
Simplified Work Simplification

—*Continued from page* 77

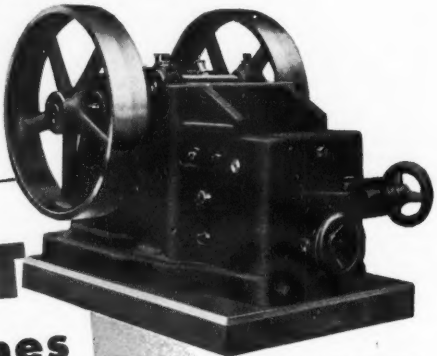
A somewhat different, but no less effective use of our work simplification training, concerns itself with entire production lines within all the milk plants. Because fluid milk is an extremely perishable food, locally marketed in a variety of products in numerous sizes and kinds of containers, dairy plant production lines are severely limited in daily length of runs of any one product in any one container. The result is a complexity of changeovers with much downtime.

This problem, given to a group of temporarily designated work simplification specialists, was attacked with vigor, and remarkable reductions in these downtimes were reached. Most interesting in the accomplishment was that nothing approaching a major change in layout or equipment was made or even recommended. This we felt was a tribute to fundamentally good engineering. However, just as emphatically, it demonstrated to us the importance of those little things which too often we are inclined to disregard but which have major effect. Just as plainly it was demonstrated that these 'little things' will only be found by those immediately concerned with the job—and most likely by the man actually doing it.

End (*Resume reading on page* 78)

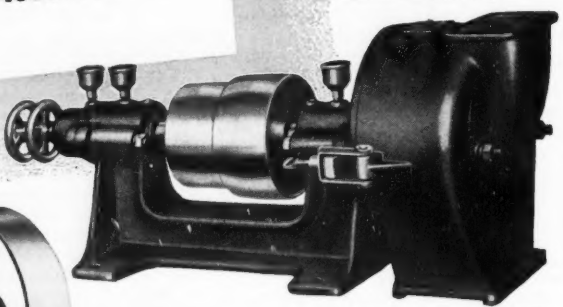


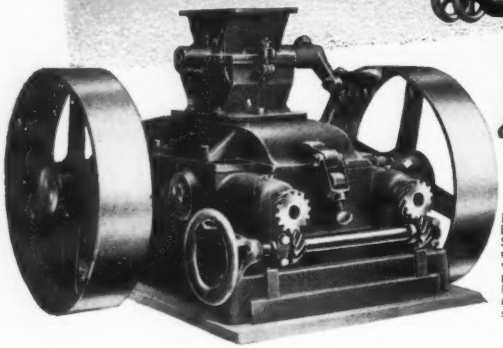
LABORATORY SWING-SLEDGE MILLS
Capable of reducing soft, moderately hard and tough or fibrous materials to any degree of fineness between 1 in. and 20 mesh. The patented "Open-Door" feature permits ready accessibility for cleaning.



STURTEVANT
Laboratory Machines
Assure Quality of Products
Fast - Economical - Accurate

LABORATORY JAW CRUSHERS
Special Roll Jaw action simplifies close regulation of the product with capacities varying from 300 or 400 lbs. per hour at finest settings, to 1000 or 2000 lbs. when opened for coarser work. Each part of the crusher is accessible for quick and easy cleaning.





LABORATORY CRUSHING ROLLS
First designed especially for laboratory sampling work, Sturtevant Crushing Rolls are used regularly in many plants where there are limited outputs. Range of output for the 8 x 5 size is from ½ in. to 20 mesh — and for the 12 x 12 size from ¾ in. to 20 mesh.

LABORATORY SAMPLE GRINDER
Laboratory Sample Grinders are of the "Open-Door" disc type and are capable of very fine work, producing products as fine as 100 mesh (coarser if desired) when working on dry, friable, soft or moderately hard materials. Simply turn hand wheel to provide product regulation from 10 to 100 mesh.

The only sure way to maintain strict quality of products is laboratory control . . . and that calls for accurate sampling.

Sturtevant Laboratory Equipment meets the exacting requirements of laboratory work. They are fast and accurate . . . provide true samples.

Rugged and dependable, Sturtevant equipment actually has all the features of full size machines plus extra accuracy and wider range of adjustment. The "Open-Door" accessibility permits quick, thorough cleaning . . . prevents the possibility of previous batches from contaminating new samples.

Investigate Sturtevant equipment for your laboratory. It will cut your sampling costs . . . help maintain strict quality of products . . . increase sales. Write for complete details and catalog.

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CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

If Its Volume You Want

—*Continued from page* 56

onto a caster-mounted wagon. The dough is now manually cut into chunks weighing approximately 10 lb., then rolled a few feet to the extruders.

At this point, chunks of dough are manually fed into hoppers supplying four extruders. In each unit, a worm-screw forces the dough under 90 psi. through a die with 19 3/16-in. dia. holes. The 76 ropes of dough extruded from the four machines then fall on a cooker-feeding, 54-in. wide and 50-ft. long canvas-belt conveyor, where a slight proofing of the dough takes place. Each rope of dough is 180 ft. long—from extruders to discharge end of the oven.

It is here that the 16 tying machines are incorporated in the line, enabling it to "double" on twisted pretzels. These units are diagonally fixed directly over the conveyor.

The "proofing" conveyor has a variable-speed drive. By adjusting the speed of the belt, the attendant operating the extruders can alter the diameter of the ropes of dough without changing dies, and accordingly compensate for changes in the consistency of the dough. For instance, if the dough is too thin, which reduces the rope diameter, then the speed of the belt can be decreased to increase the diameter. If, on the other hand, the dough is too thick, speed of the belt can be increased.

At the end of the conveyor, company-designed pick-off rollers, (ten rotating $\frac{3}{4}$-in.-dia. threaded steel rods) gently transfer the 76 continuous ropes of pretzel dough onto an 18-ft.-long inclined wire-mesh conveyor.

Continuous Cooking and Baking

Third step is continuous cooking in a caustic bath. Cooking seals the dough and permits the pretzels to become glossy during baking. At this point, the pretzel dough gets a 15-sec. cook at 190-200 deg. F. in the 12-ft.-long stainless steel-covered cooker containing the mild caustic solution. Two wire-mesh conveyors keep the dough submerged as they carry it through the cooker.

There follows automatic sprinkling of salt on the pretzel dough. As the dough leaves the cooker, it passes beneath a rotary, grooved, brass roller that collects salt from a 600-lb.-capacity hopper and evenly distributes it on the cooked pretzel dough. Salt falling through the wire-mesh conveyor is returned to the hopper.

Baking of the long ropes of dough is done in a 95-ft. long oven—another company-designed unit. A particularly noteworthy feature of this oven is the drying belt located directly below the baking section. With the installation of this dual drying-baking unit, Halter's has saved much floor space.

Pretzels are continuously baked as they are carried the full length of the oven on a wire-mesh conveyor with a variable-speed drive. Baking takes place in $3\frac{1}{2}$ min. at 325 deg. F.

The oven is equipped with 32 pressure-type gas burners, staggered above and below the baking section. Automatic instruments control temperatures in the baking and drying sections. Two 2-hp. electrically driven fans draw heat and steam from the baking zone. One fan carries steam from the oven through an exhaust duct; another draws heat from the baking area through ducts to the dryer.

Emerging from the oven, the rows of pretzels are automatically cut to length by a 4-bladed rotary cutter. Speed of this unit is synchronized to that of the belt carrying pretzels through the oven.

Cut pretzel sticks are now chuted to the drying section. Drying takes place as the pretzels are carried back on the 95-ft. under-oven conveyor. Then, a 48-ft. long canvas-belt conveyor transfers the pretzels from the oven to the packaging department.

Final operation is packaging. A conveyor elevates the pretzel sticks into hoppers feeding two automatic weighing and filling machines. These machines weigh the sticks into cartons —10 or 16 oz. Top flaps of the cartons are closed, and the packages are then conveyed to a machine that overwraps them with waxed paper.

End (*Resume reading on page* 58)

Frozen Concentrated Milk

—*Continued from page* 35

Edwards and his associates in Miami's dynamic Industries Unlimited organization.

Dr. Stahl, researcher in the frozen concentrate process for citrus, saw the possibilities and referred the problem to J. Arthur Lewis, who heads the university's Department of Food Techno'ogy. Lewis, drawing on an extensive background in citrus concentrating technics, developed a comparable milk process and brought it successfully through pilot-plant production.

Results of Lewis's work looked so good that he and Edwards sent in a process patent application. Further, Milk Concentrate Corp. was formed in Miami, with Chris Dorn as president and Edwards as treasurer, to commercialize the 4-to-1 milk.

When Gould Milk was licensed to make the product, Mr. Lewis, on loan from the University to Milk Concentrates Corp., supervised the establishment of the commercial process at the Waconia, Minn., creamery — where operations have already evolved to such a point that Lewis will soon leave Gould and work with dairies licensed to operate the process in New York, Maryland, and Pennsylvania.

And Gould, with its fast accruing experience, is already undertaking to sub-license the process in order to extensively pack under its label in the western part of the country.

What can be divulged of the process, at this point, shows very little discernible difference from 3-1 operations now employed at other dairies. However, Mr. Lewis has drawn on the field of citrus evaporation to apply both technics and precautions that are normally foreign to the milk industry.

In general, two special factors can be revealed as "keys" in the success:

1. A falling-film type evaporator with special modifications is needed for the concentrating operation, and

2. The method of pasteurizing the product is very critical.

Since details on the special precautions and handling cannot be fully revealed here, a brief survey of the superficial process, as carried out in the creamery, will show its skeleton:

Fresh milk comes from a surrounding 30-mile milkshed and is plate-cooled and stored in a 44,000 gal. stainless steel tank. Product is then homogenized, at 5,000 lb. pressure in a Mauton Gaulin unit, and short-time pasteurized by means of a 20,000-lb. Cherry-Burrell plate unit.

Pasteurized, homogenized milk is then concentrated to one fourth its former volume, in a 5,000-lb.-per-hr. Buflovak double-effect evaporator. The 4-to-1 concentrate is next plate cooled and then filled (by a Pure Pak machine) into regular waxed cartons. Filled cartons are air-blast frozen at —40 deg. F. and shipped under refrigeration by fast passenger-freight.

Most of Gould's initial output has been in 1-qt. cartons for military consumption. However, studies are in progress with different container sizes and different distribution technics, so that the company will be prepared when its planned large-scale processing facilities are in operation.

End (*Resume reading on page* 36)

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your job.*

Who pays your company's advertising bill ?

PEOPLE WHO REGARD advertising as an economic waste are fond of pointing out that it's the *customer* who pays the bill.

And they are right.

The customer also pays for your power supply, your production tools, your plant maintenance, your salaries. All these are figured into the price of your product, along with the cost of your advertising.

Does this mean that the customer pays *more* for your product because it is advertised? Not at all. No more than he pays anything "extra" for the machinery on your production line!

The truth is, your production tools enable you to *reduce* your manufacturing cost-per-unit — and hence your price to the customer.

Advertising works the same way. For it is simply the application of assembly-line methods to the *manufacture of a sale.*

How can selling be mechanized? Just consider the five basic steps —

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

Advertising performs the first three of these jobs. And it performs them *far more economically* than any other means, leaving your salesmen free to concentrate their valuable time on the two jobs they alone can do, and do best.

As with any other capital investment, the yield from advertising depends on how *efficiently* it is put to work. But this much you can be sure of: nowhere does advertising work more efficiently than in business papers, with their tremendous concentration of hand-picked readers. Nowhere will your advertising dollar go so far toward reducing the cost of *manufacturing a sale!*

THE ASSOCIATED BUSINESS PAPERS
205 East 42nd Street, New York 17, N. Y.

A Bonus Process

—*Continued from page 55*

14-in. dia. and is only 2 in. deep—an instantaneous whipping of air into the ingredient mix occurs. This is accomplished by the action of rapidly rotating blades traveling through rings of fixed blades. (see FI, July '48, pp. 82-84). The resulting marshmallow is discharged in continuous, steady fashion through a pipe outlet at the outer center of the chamber.

From the Oakes machine, marshmallow travels to an adjacent depositor where it is applied to cookies on a traveling belt. Or the discharge pipe may be connected to send this product to some other part of the plant.

Produces Uniform Product

Perhaps the most remarkable thing about the Oakes machine is its dependably uniform production. We soon discovered that, aside from the ingredients used, four variables in machine operation influence product consistency. These are:

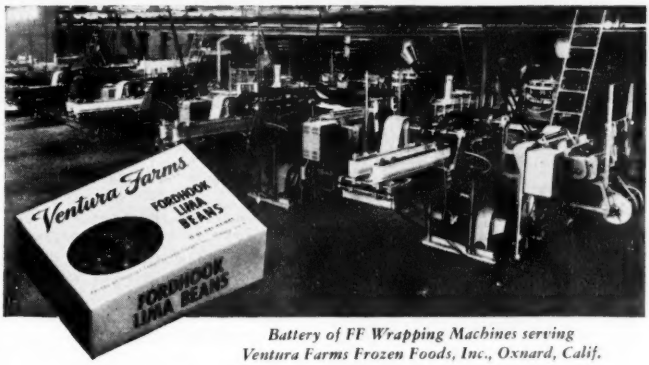
1. Quantity of syrup being delivered to machine.
2. Speed of rotor in mixing chamber.
3. Amount of air being incorporated into the product.
4. Temperature of marshmallow.

By tying these down to optimum values, the machine is capable of mak-

SANITIZING the continuous marshmallow line involves three flushes—with hot water and detergent and chlorine solution. Flush-out pipe leads to convenient sink.

The PREFERRED Frozen Food Wrapper

IS THE MODEL FF



Battery of FF Wrapping Machines serving Ventura Farms Frozen Foods, Inc., Oxnard, Calif.

Few machines have ever met with such enthusiastic approval as the Model FF Frozen Food Wrapper. It's today's fastest selling machine in the frozen food field.

Performance records in plant after plant offer convincing proof that the FF is tops in fast, dependable production. At a speed of over 100 packages per minute, it turns out uniformly perfect wraps on trays, cartons or metal-end fibre cans. Uses any type of plain or printed material suitable for frozen foods, and automatically makes allowance for variations in size due to freezing. A superior type of end-fold mechanism assures accurate location of printed matter on *ends* of the package.

The wide size range of the FF permits the wrapping of an entire line of frozen foods, and size changes are made by quick hand-wheel adjustments . . . A marvel of ease and simplicity in cleaning and oiling . . . Features the most advanced transport mechanism, with automatic provision for preventing jams and damaged cartons . . . Built virtually as a single, compact unit, the FF is easy to transport from plant to plant, if desired.

GET ALL THE FACTS

If you are seeking *proven* dependability, plus the most modern machine design, get all the facts on the FF.

Write for literature on the Model FF

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts

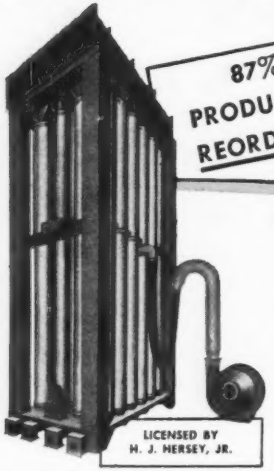
NEW YORK · CHICAGO · BOSTON · CLEVELAND
ATLANTA · DALLAS · DENVER · LOS ANGELES
SAN FRANCISCO · SEATTLE · TORONTO · MEXICO, D.F.

Some of the many brands wrapped on Model FF

AGEN
BIRDS EYE
BLUE GOOSE
CAMANO
CEDERGREEN
DIXIANA
DOLE
DULANY
ELDRIDGE
FAIRMONT
FRESH-PACT
FULHAM BROTHERS
HEART'S DELIGHT
KALE'S
LIBBY'S
OCEAN GARDEN
PICTSWEET
PINEBROOK FARMS
PRIDE OF OREGON
PRIME FROZEN
SEABROOK FARMS
SIERRA SNOW
SNOW CROP
SOUTHLAND
SPIEGL FARMS
STOKELY'S
TREE TOP
VALAMOUNT
VALLEY FROST
VENTURA FARMS

PACKAGE MACHINERY COMPANY
Over a Half Billion Packages per day are wrapped on our Machines

INDUSTRY IS PROVING DAY "AC" DUST FILTERS



87% OF OUR PRODUCTION IS FOR REORDERS FROM . . .

FIRMS SUCH AS THESE:

Archer-Daniels-Midland Co.
Atkinson Milling Co.
E. J. Brach & Sons
Buckeye Cotton Oil Co. Div.—Procter & Gamble Co.
General Mills, Inc.
The Glidden Co.
Igleheart Bros. Div.—General Foods Corp.
Kellogg Co.
National Biscuit Co.
Pillsbury Mills, Inc.
Ralston Purina Co.
Schlitz Brewing Co.
A. E. Staley Mfg. Co.
. . . and others.

THIS SUCCESS STORY SPEAKS FOR ITSELF

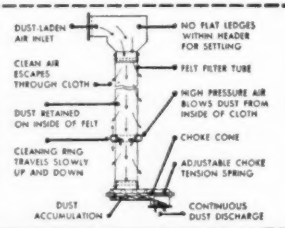
The soundness of the Day Type "AC" Dust Filter principle, effecting outstanding efficiency of operation with minimum maintenance, is verified by industry itself. 87% of our production of Day Type "AC" Dust Filters is channeled to meet the demands of users who are witnessing the results in their own plants—and reordering.

FEATURES OF THE DAY TYPE "AC" FILTER

- **CONTINUOUS-AUTOMATIC OPERATION** . . . the use of slow traveling, reverse jet cleaning rings gives automatic-continuous operation without shutdowns for cleaning.
- **CONSTANT AIR VOLUME** . . . the back pressure of DAY Dust Filters rises slightly when first started, then levels off to assure constant air volume.
- **PARALLEL AIR FLOW** . . . in the DAY Dust Filter, dust and air travel downward together.
- **HIGH AIR-TO-CLOTH RATIO** . . . 10, 15 or even 20 to 1 ratios maintained with uniform back pressures.
- **HIGH CLEANING EFFICIENCY** . . . with reverse jet cleaning, high grade filtering materials can be used because the action is gentle yet positive. Reverse jet rings move up and down, cleaning continuously.
- **NO DUST-CATCHING LEDGES** . . . DAY TYPE "AC" FILTERS, with a pattern of square-to-round inlet fittings, have no flat surfaces where dust can accumulate and become contaminated.
- **OUTSTANDING ADAPTABILITY** . . . units can be furnished with multiples of 4 tubes; housed or unhoused (see illustration); can be applied for either pressure or vacuum.

SCHEMATIC OPERATING DESIGN

The reverse air jet mechanism provides uniform cleaning over the entire length of the tubes, and operates with a maximum cloth area loss of only 1¾% at any time. Air volumes remain constant and there are no cleaning shutdowns to cause high back pressures and sharp air volume variations.


DUST-LADEN AIR INLET
CLEAN AIR ESCAPES THROUGH CLOTH
DUST RETAINED ON INSIDE OF FELT
CLEANING RING TRAVELS SLOWLY UP AND DOWN
DUST ACCUMULATION
NO FLAT LEDGES WITHIN HEADER FOR SETTLING
FELT FILTER TUBE
HIGH PRESSURE AIR BLOWS DUST FROM INSIDE OF CLOTH
CHOKE CONE
ADJUSTABLE CHOKE TENSION SPRING
CONTINUOUS DUST DISCHARGE

Write-to-**DAY** for Bulletin 491

The **DAY** *Company*

SINCE 1881

817 3rd Ave. N. E.—Minneapolis 13, Minn.
IN CANADA: P. O. Box 700, Ft. William, Ont.
Branch plants in Fort Worth, Buffalo and Welland, Ont.

ing a complete production run of exceedingly uniform marshmallow with minimum supervision.

Variable-speed drives on both the rotor and pump motors allow this optimum to be easily set. Air control, however, is slightly more complex. A hand-operated pressure-reducing valve, after the compressor, is used to lower air pressure to the machine. In addition, a Fischer & Porter Flowrator is located after this in the air line to provide a direct reading of air flow. Then comes another hand-operated valve to provide a final trim to stabilize the desired meter reading.

In addition, we have found it necessary to install two check valves after the final reducing valve in the air line. This allows only uni-directional travel in the line and prevents product back-up into the valve in the event head pressure exceeds air pressure.

Another safety factor is a pressure-relief valve installed in the syrup line between the pump and mixing chamber in the Oakes machine. This opens and discharges the syrup should the pressure in the system exceed a predetermined figure.

Sanitation Simple

Clean-up operations in our new marshmallow process line are amazingly simple when compared to the laborious schedule maintained with batch mixers. Water is simply heated to boiling in the jacketed vats and is pumped through the whole line after daily shut-down. This effectively flushes all equipment, with the rinse directed down the drain of a nearby sink. Washing out is followed with a detergent flush, and then a chlorine solution flush. In addition, the whole process is taken down weekly for a thorough scrubbing.

Contrast this to the messy clean-up job and sticky floors associated with conventional batch beaters.

End (Resume reading on page 56)

Fishery Chlorination

—Continued from page 43

magnesium, and other metallic deposits on the pipe and casing. In this "turn around", the electrode (anode) becomes the cathode, and the cathode becomes the anode. Care must be exercised while the polarity is thus reversed, for if the period is too long, pitting takes place in the pipe and casing.

The carbon or graphite-amalgam electrodes are ¾-in. thick, and they have a 700-sq. in. surface area. Due to the ionic action of electrolysis, the

electrodes become thinner and they must be replaced about once a year. Cost of replacement is approximately $65 per electrode.

Purifying Brine for Fillets

At the present time, regulatory officials do not permit the use of chlorinated *harbor water* for the actual job of washing fillets. However, for this specific purpose, pure chlorinated brine can be used in dip-tanks or to flume them from cutting table to brine-dip vats. What's more, this brine can be re-used by treating it in a specially designed system that continuously circulates it from dip-tank, through chlorine and aluminum-floc generating electrodes, then through a pressure-sand filter, and back to the fillet-dip tank.

Here are the treatment details: A 10-to-20 deg. S. brine is prepared in a make-up tank and then delivered to a fillet-dip tank, having a ball float. From this tank, the brine is pumped to a Negus cell, where 6 to 20 ppm. of chlorine is generated. Chlorinated brine then flows into the pressure filter. At this point, scales, pieces of flesh, and coagulated blood are removed from the fish by a combination flocculation and filtration process. The aluminum floc (aluminum hydroxide) generated by another electrode coagulates the impurities prior to pressure-filtering of the brine through several beds of sand and gravel. From the filter, chlorinated and clarified brine goes back into the fillet-dip tank.

Meat-Treating Pickle?

Tests are now underway to find out if this chlorine-generating and brine-clarifying system can be adopted by the meat-packing industry for treating pickle used to cure meats. Common practice here is to dump the curing solution each time it is used. If approved by the Bureau of Animal Industry, this system is seen resulting in considerable savings in time and curing ingredients—salt, sugar, nitrites, and nitrates. At the same time, the sterile curing solution carrying 0.5 ppm. of chlorine would reduce bacteria in the meats and improve their quality.

Possible application of the clarification system alone (i.e., without the chlorine-generating cell) as a means of purifying water is being investigated by a manufacturer of carbonated beverages.

Chlorine Generator on Boats

Use of the Negus chlorine-generating cell on fishing boats might well be a "natural," since these trawlers have d.c. current and, therefore, do not require a rectifier. A typical installation would comprise a 4-in. intake pipe for sea water, pump, chlorine-generating cell, and rheostat. The dial on the rheostat would be set to provide sufficient current to the electrolytic cell for generating 10 ppm. of chlorine, with a sea water flow of 100 gpm. By turning up the rheostat and reducing the flow to about 60 gpm., the amount of chlorine can be increased to 50 ppm. and the water can be used to wash pen boards and fish holds.

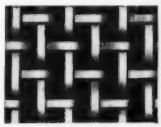
A portable chlorine-generating unit has been designed for use in plants where only fresh or low-salt content water is available. This unit, which includes a 5-lb. capacity salt-box attachment, hooked to the water line, is especially suitable for use in fruit and vegetable canneries.

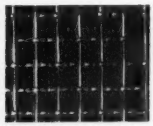
Coming Soon in FOOD ENGINEERING

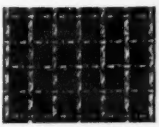
Scheduled by the scores are special articles to help you do a better job of producing quality food products at low cost. Here are just a few of the features now "on the line" for early issues of FE:

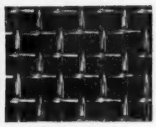
Now—A Readily-Made Fondant for Bakers, Confectioners
Jiffy Test of Chocolate Temper
"Vertical Cure" of Costly Clog (Materials Handling)
Rich Powder From Papaya
Advanced Engineering In New Brewery
Piloting a New Product? Don't Spare Teamwork, Flexibility, Vigilance
New Flavor-Evaluation Method
Permanent Pipe Lines Save Cleanup Time
Legal Aspects of Sanitation
Restyling Byproducts Will Add New Income
Advanced Air Conditioning Boosts Bakery Output

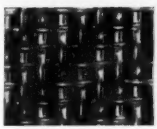
9 REASONS for specifying *Cambridge* Industrial Wire Cloth


1. Flat Wire Mesh

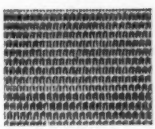

2. Single Intermediate Crimp

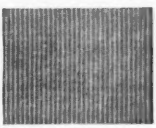

3. Double Intermediate Crimp

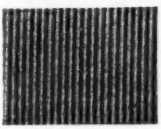

4. Double Crimped


5. Twilled Weave

6. Calendered Backing Screen


7. Oblong Mesh


8. Plain Dutch Filter Cloth


9. Twilled Dutch Filter Cloth

● **SELECT THE WIRE CLOTH** that meets your requirements best from these 9 basic Cambridge weaves. Each is available to you in any metal or alloy wire of any gauge. Mesh sizes range from 4" openings to 20 x 250 mesh, according to your needs. *Many types of Cambridge wire cloth are ready for immediate shipment.*

Close attention to each loom by individual operators during weaving is your assurance of exact mesh count. Each finished piece is carefully inspected before shipment to make certain it is free from defects.

TELL US your special problem in filtration, screening or sizing. Perhaps our facilities and experience can be combined to produce the special type of wire cloth needed.

FREE WIRE CLOTH HANDBOOK! 73 pages of specifications, metallurgical data and descriptions of industrial wire cloth. WRITE TODAY for your copy of this valuable reference book.

The Cambridge Wire Cloth Co.
Dept. Q • Cambridge 7, Md.

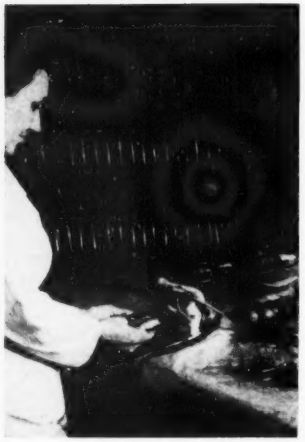
WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES
See "Wire Cloth" in your Classified Telephone Directory.

NEW PACKAGES & PRODUCTS

Wieners, butter in first . . .

. . . sauce follows, and . . .



. . . pouch is heat-sealed

Cook-In-Pouch Frankfurters

A visibly appetizing "Picnic-Pak" Pliofilm pouch, containing four skinless frankfurters, a savory barbecue sauce, and a pat of butter, is now being offered by Herman's Sausage Co., Tampa, Fla.

The pack, produced by Milprint, Inc., Milwaukee, is well-suited to the needs of picnickers, campers, fishermen, and other outdoor eaters. Printed on the back of the package are instructions to submerge the whole unit in boiling water for 7 min., slit the pouch, and serve.

The 12-oz. unit is lightweight, easy to pack for trips, and said to be tear and puncture resistant. In addition, the package is reported to give excellent flavor protection and to reduce moisture loss.

Zesty Sauces From the Deep South

Two new sauces—barbecue and seafood cocktail—have been introduced by Hitching Post Foods, Inc., Yemassee, S. C.

These items expand the company's line that already includes Mint Syrup, Creole Spiced Vinegar, Jack Pot Beans, and Dressing. The last named recently has now been improved through emulsification.

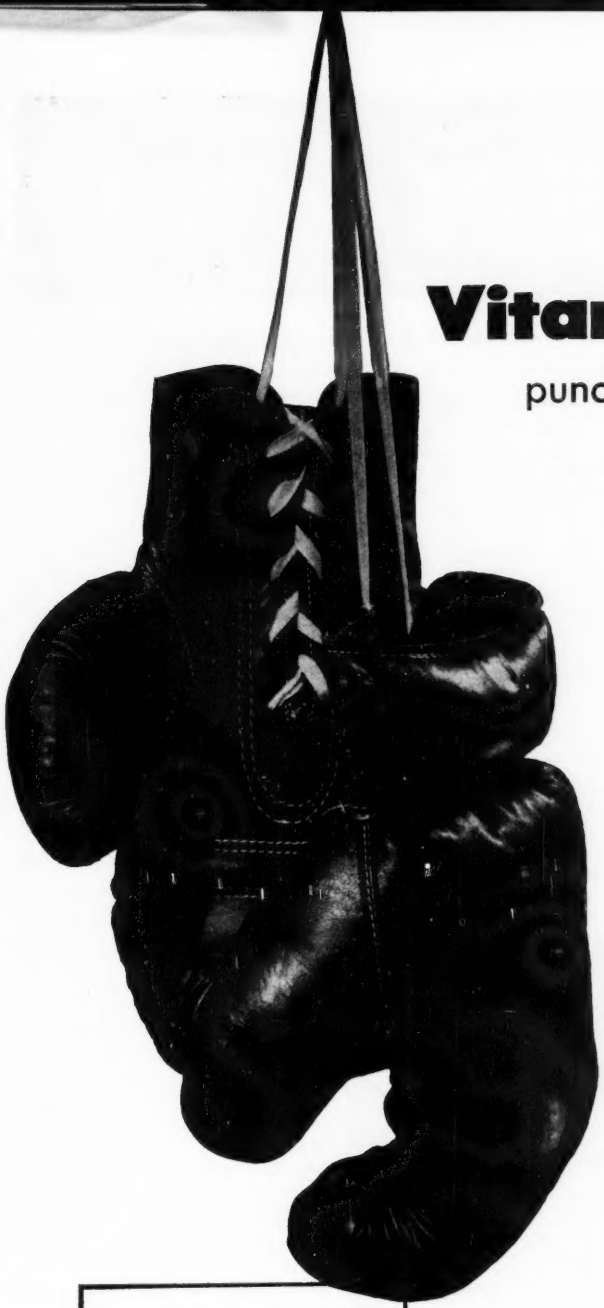
Prepared from old southern recipes, these products have won a favorable market.

Although distribution is concentrated on the Eastern Seaboard, shipments are made to every state in the Union. Also marketed, is a wide selection of giftbox assortments in gaily decorated boxes.

The containers achieve definite eye-appeal through the colorful label designed by Walt Disney. The bottles, are unique—the company's exclusive design, manufactured by Maryland Glass Co., Baltimore.

Closures, carrying the Hitching Post trademark in colorful yellow, black and red, are supplied by Bernardin Bottle Cap Co., Inc., Evansville, Ind. Crown Can Co., Philadelphia, furnishes the cans for the Jack Pot Beans.

For More Data on Package Supplies Named Use Reader Service Card



Vitamin A adds new punch to your sales story!

IF you need some heavy leather to throw into the sales story of your food product, picture this phrase on your label: "*Enriched with Vitamin A*".

And when you turn to vitamin A, you'll naturally want to turn to DPi. For DPi's molecularly distilled vitamin A is taste-free and it's the most stable natural vitamin A concentrate available for use in pharmaceutical or food products. This is a result of DPi's worldwide sources for natural fish liver oils —and a big modern plant for continuous, large-scale refining and molecular distillation.

Yes, if you need more punch in your sales and feel that DPi Vitamin A may be the answer, be sure to call on us. We'll be glad to discuss your problem in detail. Simply write ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales Offices: 570 Lexington Avenue, New York 22, N. Y. • 919 North Michigan Avenue, Chicago 11, Ill. • Gillies & Loughlin, Los Angeles and San Francisco • Charles Albert Smith Ltd., Montreal and Toronto.

DPi

leaders in research and production of both natural and synthetic vitamin A

Also . . . high vacuum equipment . . . distilled monoglycerides . . . more than 3400 Eastman Organic Chemicals for science and industry

LESS CLOGGING WITH MONARCH

In many Food Processing plants Monarch Spray Nozzles are used to . . . .

Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

Remember

if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

MONARCH MFG. WKS., INC.
2517 E. Ontario Street
Philadelphia 34, Pa.

Desodiumized Meat for Those on Salt-Free Diets

After experimenting with hundreds of processes and recipes, Armour and Company's Chicago research division has succeeded in producing a line of "low sodium" canned meats for people requiring a salt-free diet.

Being a buyer of 100,000 tons of salt a year, to cure and flavor food, Armour found a real challenge when asked to develop meat products which were low in sodium and yet convenient to use, as well as being flavorful.

For years, millions of sufferers from heart disease, and other ailments requiring a special salt-free diet, have had to shun meats. But through the successful desodiumizing, these people may now enjoy it without harm to their health.

These new meat products, put up in 5½ oz. cans—a single serving—contain only 30 to 50 mg. of sodium per 100g. of food, in contrast to 440 to 810 mg. per 100g. in regular production of similar canned items. The label on each can gives the sodium content so that physicians and dieticians can easily calculate a patient's total daily sodium intake.

No salt or salt substitute is added to the food in canning. Only standard spices and vegetable flavorings are used. In addition, vegetables and other ingredients are chosen for low sodium content. No chemicals are used in this process for reducing sodium in meat.

Initial production includes beef stew, beef hash, beef and gravy, chili con carne, meat loaf and meat sauce.

These products are being prepared and packed by Armour and Company, Chicago. Hilsom Corp., New York City, has exclusive distribution, which though now confined to the East Coast is expected to be put on a national scale shortly. In addition to the individual 5½ oz. can, institutional packs are expected to be placed in production in the near future.

Labels were designed by Hilton & Riggio, New York City, advertising agency for Hilsom Corp.

Licorice Goes Modern

After ten years of research and development, three new products derived from the licorice root will be introduced in August by Lic-Rich Co., Cleveland.

First of the three is "Lic-Rich," a licorice-flavored carbonated soft drink. It will be sold nationally under franchise agreement with bottlers and through open sale to cup vending machine companies.

Mr. Bowers, president of the company, is responsible for the package design. Bottles are manufactured by the Ball Glass Co., Muncie, Ind., and Owens-Illinois Glass Co., Toledo. Armstrong Cork Co., Lancaster, Pa., Mundit Cork Co., No. Bergen, N. J., and Mitchell & Smith, furnish the crowns. Cartons are supplied by American Coating Mills Div., Owens-Illinois Glass Co., Chicago.

"Lixie", a licorice ice cream, and "Lix", a licorice popstick, are the other two products to be introduced. Concentrate for these items are being sold to all ice cream manufacturers on a non-exclusive basis.

Another item which the company expects to launch shortly is a self-carbonating licorice pellet. It will only be necessary to drop it in a glass of water to obtain a carbonated soft drink.

Promotion is being handled by Hutchins Advertising Co., N. Y. C.

Welsh Rarebit Roll

With its welsh rarebit released for national distribution, Purity Cheese Co., Mayville, Wis., now has a total of eight rolls, of various flavors, on the market.

The rarebit is packaged in a transparent yellow-tipped Pliofilm, supplied by Shellmar Products Corp., Mt. Vernon, Ohio. Lettering is in dark blue. Basic design is similar to the company's other rolls.

Containing all the blended rarebit ingredients, the product affords four generous servings—all the housewife need do is heat and eat. It also has a special economy slant in that the user can slice off the amount desired and return the roll to the refrigerator for future use.

Meanwhile, another new Purity Cheese Co. product is announced by Keck-Franke, Oconomowoc, Wis., advertising agency for the company. This is a baby loaf of natural Edam cheese of characteristic nut-like flavor. Specially shaped to make slicing easy, it comes in an attractive red wrapper.

Spread In Plastic Wrap

Now on the market nationally is a new meat-food sandwich spread processed by Oscar Mayer, Madison, Wis. It contains meat, sweet pickle relish, pimento and salad dressing.

Eight ounces are packaged in a transparent casing of saran film, supplied by Dow Chemical Co., Midland, Mich. This wrap gives it a "see-what-you're buying" feature.

POWDERS

FREE FLOWING SOLIDS

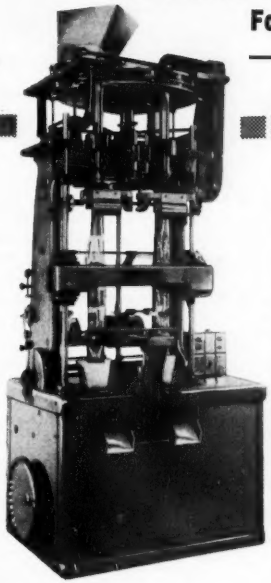
TABLETS

LIQUIDS OR SEMI-LIQUIDS

TRANSWRAP

HERE'S HOW TRANSWRAP HELPS YOU BEAT YOUR PACKAGING PROBLEMS TODAY!

For everyday civilian sales —and for government contract packaging



Transwrap's fully automatic, high-speed packaging of your product is the answer to your 3 big critical shortages . . .

MANPOWER Transwraps are *fully* automatic. One unit exceeds the output of 15 to 18 hand workers; and 2 operators can handle 10 Transwraps. This means you can increase your production per man-hour as much as 90 times!

TIME One Transwrap can automatically *form, fill, seal and deliver* 216,000 packages in an around-the-clock, 24-hr performance! This high-speed dependability is why more Transwraps were used in WW2 govt packaging—and are again, in today's emergency.

MATERIAL Save on both bag and product wastage. Transwraps use economical roll materials; eliminate wasteful puckering, distortion and gumming of bags; insure extra-fine precision measuring; minimize expensive breakage of fragile products.

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Frick NEW "ECLIPSE" Compressors at Bettendorf's Super-Market, St. Louis

Dual-Use Product—Pudding or Pie Filling

General Foods Corp., New York City, has inaugurated a novel selling program for one of its leading products—Jell-O Puddings. Discovering the successful use of this product as a pie filling, the company redesigned the packages to promote both uses.

In addition to the three original flavors—chocolate, vanilla, and butterscotch—a lemon flavor was added recently.

The new package is colorfully designed, with a color band at the bottom—chocolate brown for chocolate flavor, blue for vanilla, yellow for lemon, and tan for butterscotch. A full color illustration of the prepared product appears on the front of each package. Sides and back give various pudding and pie recipes. The Jell-O, trademark continues to appear in the well-known "big red letters".

Redesign of the package was handled by Young & Rubicam, New York City, the company's advertising agency.

Cowboy-Motif Used

With special appeal to the juvenile market, Jones Foods, Inc., Louisville, Ky., is now marketing "Gremlin" peanut butter in 10-oz. re-usable glass tumblers which are carried out in a cowboy motif.

Using applied color decorations, the glasses feature a cowboy-and-lariat design in black and white. Product identification is carried by paper labels on the caps.

The product is a non-separating stabilized butter containing hydrogenated peanut oil.

The pressed tumblers are supplied by Owen-Illinois Glass Co., Toledo, with Fuller Label & Box Co., Pittsburgh, furnishing the labels. Metal closures are supplied by White Cap Co., Chicago.

Frozen Mangos With Lime

A completely new product—frozen sliced mangos, with the addition of lime juice to prevent discoloration—has been put on the market by Parman & Kendall, Homestead, Fla. Preliminary experimentation in the freezing and heat processing of mangos was carried on at the food technological laboratories at U. of Miami, Coral Gables, Fla.

Because of the short supply of mangos, distribution is at present limited to Florida. It is currently being put up in 12-oz. packages, but distribution in 30 lb. tubs to ice cream manufacturers is contemplated.

The consumer size uses a "Nestrite" wax paperboard container supplied by Lily-Tulip Cup Corp., N.Y.C. The lid has a cellophane window giving the product good visibility.

New Coconut Tidbit

A tasty, crunchy, new tidbit, known as Coconut Chips, has been introduced from Hawaii by the Polynesian Food Spec. Inc., Honolulu.

Four ounces of toasted and salted coconut strips are hermetically sealed in a can, keeping them crisp and fresh.

Two Cake Mixes

A devil's food and an all-purpose cake mix have been introduced by Russell-Miller Milling Co., Minneapolis.

Campbell Mithun, Inc., Minneapolis, advertising agency for the company, has designed colorful cartons to create point-of-purchase appeal. They are made of clay-coated newsback board with varnish finish, supplied by American Coating Mills Div., Owens-Illinois Glass Co., Chicago.

Printed in red, brown, yellow, blue and white, one carton features a full-color, chocolate-frosted white cake on a gold-rimmed white plate, while the other has a full-color, white-frosted devil's food cake on a gold-rimmed blue plate. Sections are shown cut from each cake to illustrate the texture. On reverse side of cartons are instructions and recipes.

Package & Product Shorts

New Breakfast Cereal

Ralston Purina Co., St. Louis, has been test-marketing a new breakfast cereal known as Rice Chex Bite Size. It is packaged in the company's well-known red and white check carton with blue and white lettering. The product is a ready-to-eat cereal made from rice, sugar, salt and malt.

Quick Frozen Pheasant-Chicken

Originally packed solely for the institutional trade, a pheasant-chicken product is now being marketed by Van Ness, Castro Valley, Calif. for the retail trade under the name of "Chil-Chick." Two packs are being offered: One, the whole bird, sealed in Cry-O-Vac, vacuum pack of Dewey & Almy Chem. Co., Cambridge, Mass.; the other, a quartered fowl in a waxed paperboard carton.

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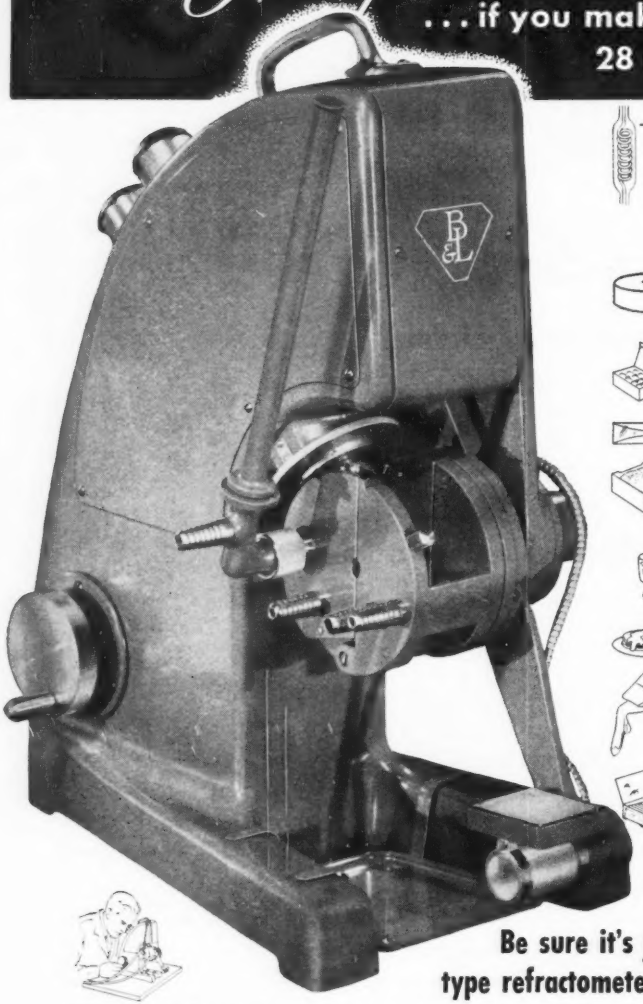

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ADVANCES IN TECHNOLOGY

Partial Cooking and Regrinding Before Packing Enhances Quality of Vacuum-Canned Meats

Improvement in the quality and appearance of ground meats that are packed under vacuum in glass or metal containers is the object of a patented process. In one embodiment of the invention the meat is ground and cooked, as by braising, and preferably without the addition of water, to a point where there is coagulation of the soluble proteins and denaturation of insoluble proteins, but below the point at which the hemen of the tissues is destroyed.

Good results are obtained at temperatures of 170-200 F. for 15-30 min. The material is then reground to a finer condition so that new cut surfaces are presented for absorbing juices and moisture. Juices cooked out of the meat in the initial step are added during the second grinding. About 5-6 percent moisture also is added.

When this material is filled into a container, some unabsorbed liquid is visible; but after being evacuated, sealed, and sterilized the product regains its pink color, the juices are absorbed, and the meat expands and completely fills the container. The fat constituent also seems to be evenly distributed throughout the mass.

The crux of the process is in the second grind which exposes new capillary surfaces that more effectively reabsorb the juices and cause the meat to expand and fill the container.

Digest from U. S. Patent 2,535,405, issued Dec. 26, 1950, on an application dated Feb. 8, 1947, to Robert R. Fulton, Chicago, and assigned to Armour and Co.

Flavor of Turkey Meat Influenced By Feed

Typically fishy flavors and odors in roasted turkey meat, which may be caused by feeding fish products, can also be produced by feeding highly unsaturated vegetable oils. And, addition of unsaturated oils prevents such flavors and odors even when fish meal is fed.

Bronze tom turkeys were removed from the stock ration at age of 20 weeks, divided into 4 groups of 6 each, and fed experimental diets for 8 weeks. These diets were composed of a basal mixture plus (1) 12½ percent meat meal + 5 percent coconut oil; (2) 12½ percent meat meal + 5 percent linseed oil; (3) 10 percent fish meal + 5 percent coconut oil, and (4) 10 percent fish meal + 5 percent linseed oil.

At the end of the 8-week period, turkeys were slaughtered, eviscerated while warm, packaged in moisture-vapor-resistant bags, frozen at −35 F. and stored at −30 F. for 2 weeks. Then 2 turkeys from each group were analyzed for iodine number, fatty acid composition, peroxide value and organoleptic characteristics. The remaining birds were then stored at 0 F. and analyzed after 3 and 13 months.

Induction periods of the fat were about 25 times as large for coconut-oil as for linseed-oil groups. Peroxide values indicated the marked accelerating influence of linseed oil on rancidification. Linseed-oil groups, either with or without fish meal, had pronounced fishy odors and flavors, whereas coconut-oil groups lacked this or other off-characteristics. The group fed a supplement of fish meal + linseed oil (4) had slightly worse off-flavor scores for fat and drippings than did the group fed meat meal + linseed oil (2). No apparent increase in intensity of fishiness was apparent over the 13-month storage period.

Digest from "The Role of Dietary Fat in the Quality of Fresh and Frozen Storage Turkeys," by A. A. Klose, E. P. Mecchi, H. L. Hanson and H. Lineweaver, WRRL, Albany, Calif., *The Journal of the American Oil Chemists' Society*, 162-64, April, 1951.

Chalkiness in Halibut No Sign of Disease

Investigation of the nature of chalkiness in Pacific halibut has yielded some interesting information on the chemical composition of chalky halibut flesh, but gives no hint that the condition is an indication of disease in the fish. Analysis of chalky and clear halibut shows that the sum of percentage of oil plus percentage of water shows a general downward trend with increasing chalkiness. Samples for analysis were taken from the same boat load, and included normal, moderately chalky, and very chalky fish. Commercially frozen wrapped fillets were also examined, these having been graded as normal and moderately chalky. Analytical data show that the percentage of oil in the raw flesh rises with increased chalkiness, while the corresponding percentage of water showed a decrease. But the differences in percentage of water were greater than the corresponding percentages of oil, so that the sum of the two showed a downward trend with increased chalkiness. Studies of salmon and herring show uniform percentages of oil plus water at different periods of their life, despite wider ranges than those found in halibut.

Digest from "Chalky Halibut," *Bulletin* No. 84, Fisheries Research Board of Canada, Vancouver, B. C., October, 1950.

Average Freezer Temperature Controls Fish Quality

Fluctuations in temperatures of freezer-storage have no adverse effects upon the quality of frozen fish fillets as based on palatability scores, volatile acid numbers, drip determinations, and visual examinations. Average storage temperature during fluctuations seems to be the deciding factor.

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A total of approximately 500 samples of Cellophane-wrapped striped bass and Boston mackerel fillets were held at −10, 0, and +15 F., and at temperatures fluctuating between −10 and 0, and between 0 and +15, at cycles of 1, 3, and 4 days, for various lots.

The striped bass fillets held at −10 and 0 remained in a satisfactory condition for 8 months, as did the samples held at temperatures fluctuating between the two. After 9 months the samples stored under this fluctuating range and those at −40 F. were still satisfactory and received the same scores. But the samples held at 0 were not considered satisfactory. After only 4 months at +15 bass fillets failed to receive an acceptable score. Those undergoing temperature fluctuations between +15 and 0 were still acceptable.

Boston mackerel fillets had a storage life of about 2 months at +15 and approximately 4 months at −10 and 0. Scores for samples undergoing temperature changes between −10 and 0 did not differ greatly from those held at −10 or those held at 0. In case of samples subjected to fluctuations between 0 and +15, scores for the first 2 months did not signify any greater deterioration than for those held at +15.

Digest from "Effect of Fluctuating Storage Temperatures on Quality of Frozen Fish Fillets," by S. R. Pottinger, *Commercial Fisheries Review*, 19-27, Feb., 1951.

CEREAL PRODUCTS

Starch From Wheat Flour

An operable method of recovering gluten-free starch from wheat or wheat flour has been developed by Canadian researchers. Flour is formed into a thin dough or batter by adding water (about 80 percent of the flour weight) and mixing for 20 min., followed by addition of more water (equal to 275 percent of the flour weight) and further mixing for 3 min. This treatment reduces the gluten to small curds and leaves the starch in suspension.

On passing the mixture over a Rotex screener with a 150 mesh stainless steel screen, gluten comes off as a cohesive mass, while the starch liquor passes through the screen to a starch table for recovery. Most efficient recovery was obtained at 60 deg. Be slurry density and a pH of 6.0. About 55-60 percent of the starch could be recovered in one passage over the table; 65-70 percent if tailings were retabled. Starch was of prime quality, containing 0.5 percent protein.

Centrifuging the slurries increased the recovery to practically quantitative, but the protein was higher, about 0.75-1.0 percent. Crude gluten (66 percent moisture) recovery was practically complete. Drying on a double drum dryer yielded a product containing 12 percent starch and 80 percent protein.

Centrifugal starch liquors could be recycled 10 times as make-up water for dough preparation and slurrying, but if SO_2 were added they could not be reused because of the solubilizing effect of sulfites on gluten. Fermented starch liquors are still usable for doughing operations, but their pH must be adjusted to 6.0.

Digest from "Separation of Starch and Gluten VI. Starch Recovery and Purification", by G. A. Adams, *Canadian Journal of Technology*, Vol. 29, No. 5, 217-31, May 1951.

FATS AND OILS

Bland, Odorless Lard

Production of an animal shortening that has a high smoke point and is free from odor-bearing materials and free fatty acids is the object of a recent patented invention. A mixture containing a major portion of prime steam lard and lesser proportions of edible beef tallow and lard flakes forms the raw material for the shortening. The apparatus is comprised of a stack of 5 trays enclosed in a tower operated under a vacuum of approximately 6 mm. Hg. The upper 2 trays are equipped with coils for heating and the bottom one has cooling coils. All trays have sparge lines connected to a steam header.

In operation, a batch of the mixture, previously liquefied to permit pumping, is dropped into the top tray and heated to approximately 355 F., then dropped to the second tray and heated to about 475 F. From here it is discharged into the first deodorizing tray and slowly cooled to 450 with steam agitation, then into the second deodorizing tray where it is further cooled and agitated to 425 F. When properly deodorized the batch is dropped into the bottom tray and cooled to about 150 F. at which temperature it is removed from the vacuum chamber.

Digest from U. S. Patent 2,536,865, issued Jan. 2, 1951, on an application dated Jan. 25, 1949, to E. G. Anderson, Hamilton County, O., assigned to The E. Kahn's Sons Co., Cincinnati.

Aqueous Nut Emulsion

Peanuts ground extremely fine will yield a stable aqueous emulsion having characteristics ranging from those of milk to thick custard. The patented process is carried out in a colloid mill in which nuts are ground so fine that

85 to 97 percent of the product will pass through a 325-mesh screen, while only 5 to 0.5 percent will remain on a 200-mesh screen. The syrup-like product, consisting of solid particles suspended in nut oil, is formed into a stable aqueous emulsion by adding water and heating to 150-190 F. prior to homogenization. Further stability can be obtained by adding about one percent of an alkalizing agent such as disodium phosphate, raising the pH to 6.6-6.8. To insure the highest degree of stability for shipment and storage of the emulsion, an edible emulsifying agent is added in amounts of a few tenths of one percent by weight. Alginates, gelatin, and vegetable gums are suitable for the purpose. The emulsion may be converted into a variety of flavored drinks and foods, including frozen confections of texture similar to that of ice cream. In the latter case the whipping quality of the emulsion is increased by adding about 0.5 percent dried egg or 2 percent fresh egg.

Digest from U. S. Patent 2,511,119, issued June 13, 1950, on an application dated Sept. 20, 1947, to J. H. Mitchell, Jr., Birmingham, Ala., assigned to Stevens Industries, Inc., Dawson, Ga.

BEVERAGES

Preventing Haze In Beer

Production of beer that will remain stable until consumed, must start with proper raw materials. Malt from low protein barley, modified in a way that reduces high molecular weight proteins without injury to foam producing proteins is the beginning. Mashing at relatively high temperatures without rest also reduces likelihood of solubilizing proteins that will lead to hazes in the beer. Boiling in the kettle at pH 5.2 must be vigorous and extensive enough to insure maximum coagulation of the proteins and protein-tannin complexes that could later come out as hazes.

The pH reduction accompanying fermentation is a further stabilizing influence, but this drop should not be too fast, else foam quality may suffer. Long storage at 0 C., followed by proper filtration favors stability, though it does not follow that a clear beer is a stable beer. Colloidal micelles are still present and, under the influence of chilling, heating, or shaking during shipping, will show up as a sheen or veil in the beer, and finally as a visible flocculation. Addition of stabilizers in the form of finings, tannin and gelatin, bentonite, or activated carbon, followed by filtration will delay agglomeration of colloidal

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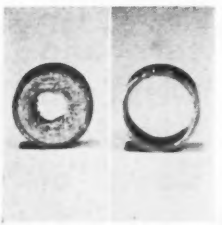

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micelles, and digesting enzymes will tend to keep them in solution. Both treatments are used successfully.

Finished beers can suffer in stability through improper handling and storage, but atmospheric air is one of the greatest enemies. Unpoised beers of high ITT value are especially vulnerable to oxidation and, since the popular light beers belong in this group, they should be handled without coming in contact with air. Carbon dioxide should be used for counter pressure and transfer. Such beers are also most affected by metals such as iron, copper, and tin, that catalyze oxidation.

Digest from "The Colloidal and Biological Stability of Beers," by W. Kleber, *Brauwelt*, 46, 973-76, Nov. 16, 1950, and 47, 999-1002, Nov. 23, 1950.

PACKAGING

Ice-Walled Package For Frozen Foods

Production of quick-frozen food in package form without using a conventional carton is the object of a recent patent. Also, this packaging method is said to prevent sale of thawed and refrozen products.

The above mentioned objects are accomplished by providing a holder, formed of ice walls, to receive and give shape to the contained food prior to freezing, then freezing same together as a unit and finally wrapping and sealing the whole. Due to the ice walls, the original form and appearance of the package will disappear if once thawed. Ice walls should be relatively thick and precooled sufficiently to conduct heat away from food products without starting to thaw. After freezing, the walls may be thinned to $\frac{1}{8}$ in. or less before wrapping.

Digest from U. S. Patent 2,522,221, issued Sept. 12, 1950, on an application dated Sept. 20, 1944, to T. G. Slade, Jr., Chicago, Ill.

DAIRY

Enzymatic Hydrolysis of Whey Gives Useful Protein Food

Swiss cheese whey may be converted into a product that is suitable for use in spreads, cheese foods, cultured cream and bakery goods by a method developed at the Bureau of Dairy Industry, USDA.

The protein is first precipitated by addition of glacial acetic acid to hot (200-205 F.) whey, then collected and drained. PH of the separated protein should be 5.3-5.5. Partial hydrolysis

is accomplished by heating the precipitate to 103-105 F., adding approximately 1.1 percent salt and 0.35 percent Rhozyme, and holding (with mixing) for 20-30 min.

The product is then heated to 175-85 F. to inactivate the enzyme and improve keeping quality, then homogenized at 2,500 psi. Hydrolyzed protein has a smooth texture, white color and practically no flavor. It can be kept for as long as 2 weeks at 32-40 F.

An exceptionally good spread can be made by mixing the above product with cultured cream to produce an end-product testing approximately 25 percent fat, 16 percent snf., and 59 percent moisture. Pimentos, relish, or olives have been added to the basic spread with excellent results.

Digest from "Enzymatic Hydrolysis of Whey Protein for Food Use," by J. P. Malkames, Jr., H. E. Walter and O. S. Sager, BDI-Inf-118, USDA, Bureau of Dairy Industry, Washington 25, D.C., March, 1951.

FERMENTATION

Fermentation of Palm Kernels

Palm kernels often contain enough fragments of fleshy pericarp to make them ferment and heat if they become damp, as has happened in stacks exposed to weather. Temperatures as high as 167 F. can be obtained by this fermentation, and 122 F. has actually been measured in stacks of bags exposed to rains. Heating and fuming of kernels in bulk storage indicated that 239 F. had actually been reached, much too high for a fermentation reaction to be a factor.

Palm kernel oil is oxidizable, though not to the extent of linseed oil, and it is concluded that, if the bulk of stored kernels is large enough, oxidation reactions can occur that make spontaneous heating and ignition possible. Fires that have occurred while breaking down stacks of bags, or transporting them on barges, or in storage for 2 months or longer, make the spontaneous hypothesis plausible.

Digest from "Spontaneous Heating and Ignition in Stored Palm Kernels. I. A Survey of Occurrences of Heating and Fire," by P. C. Bowes, J. H. Burgoyne, T. P. Hilditch and A. Thomas, *Journal of the Science of Food and Agriculture*, Vol. 1, No. 12, 360-61, Dec. 1950.

Protein Coagulation in Wort Affected by Preboiling pH

Wort boiling is the step in brewing that gives color to the finished beer, coagulates undesired proteins, and extracts the bitter flavoring substances from hops as well as the tannins that aid in protein precipitation. The pH of the wort is known to affect these

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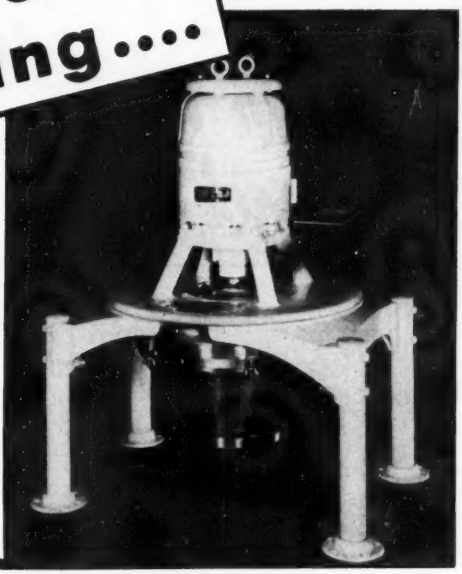

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The "ENTOLETER" Mixer requires only 12 cu. ft., with capacity of 12,000 lbs. of finished mix per hour.... where beetle or similar insect infestation may be present, this equipment destroys all stages of insect life. Mail coupon today.

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The Safety Car Heating & Lighting Co., Inc.
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Please send bulletin describing the "ENTOLETER" High-Speed Mixer

Name.....
Company.....
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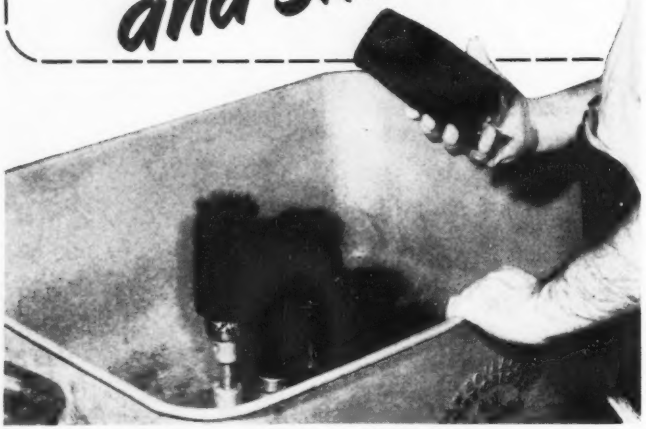
Foreign Distributors: Henry Simon Ltd., Stockport, England

Cleans 104,000 Ham Molds . . . and Still in Use



FULLERGRIPT NYLON HAM MOLD BRUSH OUTLASTS PREVIOUS BRUSH 26 TO 1

At the Newark, N. J. plant of the Hygrade Food Products Corporation, the brushes previously used for cleaning ham molds had lasted just one week. In addition, the fibers sometimes got into the meat.

Then Hygrade installed Fullergript nylon brushes. After six months of constant operation, the Fullergript nylon brushes were still in use — a 26 to 1 increase in brush life over the previous brushes. The heavy loading of nylon made possible by the unique Fullergript construction is the reason for this exceptionally long service. And there is no danger of individual filaments coming out because the brush material is anchored in a rust-resistant metal channel.

Still another advantage of the Fullergript nylon brush discovered at the Hygrade plant is that it provides faster washing and more thorough cleaning of molds.

Here is a new cost-saving brush that it will pay all meat packers to investigate. There are similar production economies available to other branches of the food industry with Fullergript power brushes. To learn how Fullergript can help cut *your* costs, simply write to . . .

FULLER BRUSH

FULLERGRIPT

At home...in business, too

THE FULLER BRUSH CO.
INDUSTRIAL DIVISION
3640 MAIN STREET • HARTFORD 2, CONNECTICUT

reactions, and pH 5.2 is usually considered optimum. Coagulation of protein takes place over a range of pH 4 to 7. Experimental all-malt brews, adjusted to varying pH's with HCl, have shown that the coagulable nitrogen, remaining in hopped wort after boiling, decreases as the pH drops from 5.8 to 4.7 before boiling. Worts of pH 5.8 drop to about 5.5 on boiling 1-2 hr., but the amount of coagulable nitrogen remaining in them is greater than in worts initially at pH 4.75, that only drop to 4.73 on boiling.

Digest from "The pH Optimum for Protein Coagulation During Boiling of Wort" by P. Kolbach, *Die Brauerei Wissenschaftliche Beilage*, 3, 10, 73-76, October, 1950.

DEHYDRATION

Egg Acidifying Methods Extend Storage Life

Two simple pre-drying procedures that increase storage life of dried whole eggs 2-6 times have been developed in recent years. One process consists of acidifying the liquid egg before it is dried. The other, of eliminating the small amount of sugar from liquid egg before drying.

Acidification is accomplished by adding enough CP HCl to liquid egg under agitation to reduce the pH to 5.5. To overcome the acid taste, $NaHCO_3$, in an amount sufficient to raise the pH of the reconstituted product to 6-8, is blended dry with the powdered egg.

In the second process, yeast is used to ferment liquid egg before it is dried. Obviously other microorganisms, enzymes, or even dialysis might be used if practical procedures were found. The liquid egg is treated with enough baker's yeast to ferment the sugar in 2-4 hr., then pasteurized and spray dried. The product has a little yeastiness that does not seem to be objectionable.

Digest from paper presented by Dr. Hans Lineweaver, Western Regional Research Laboratory, Albany, Calif., at Fact Finding Conference, Institute of Amer. Poultry Industries, Kansas City, Feb. 11, 1951.

MISCELLANEOUS

Mixture of Glutamates Ups Food Flavors

Superior flavor developing properties are claimed for a patented composition which is a mixture of glutamic acid and ammonium glutamate. In a modification of the invention glycine may be added to the other two substances, increasing effectiveness.

Carpenter's New Slide Chart Gives Data on Stainless Tubing

Bending information for Stainless Tubing and Pipe shows desirable radii for bends of 45° to 180°.

Coil diameters for Stainless Steel Pipe from 1/8" to 4" are given in easy-to-use form.

The Carpenter Stainless Tubing Slide Chart gives you data on Analyses, Standard Sizes, Bends with and without Mandrels, Tensile Strength, Rockwell Hardness, Heat Resistance, etc.

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Carpenter STAINLESS TUBING and PIPE
THE CARPENTER STEEL COMPANY
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If you would like a copy of this useful Slide Chart published by Carpenter, just drop us a note on your company letterhead. We'll be glad to put one in the mail for you.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department: Carpenter Steel Co., Reading, Pa. — "CARSTEELCO"

Carpenter
STAINLESS TUBING
Analysis · Tolerance · Finish
— guaranteed on every shipment

car-loading cost cut 90% with powered industrial trucks

CASE HISTORY REPORT

on how a metal-processing plant keeps operating costs down..saves space

● **PROBLEM:**

A. Loading 250 tons of metal slabs, weighing 50 pounds each into five box cars each day.

B. Keeping loading costs to a minimum.

● **SOLUTION:**

Two powered-industrial trucks were assigned to the job. Eighty metal slabs were stacked in unit loads at the production line and moved directly and stowed as unit loads in outbound box cars.

● **RESULTS:**

Using manual methods, this work cost $1.05 per ton handled. But by using powered-industrial trucks, handling costs are held to approximately *10 cents per ton*—a saving of 90%!

● **OTHER BENEFITS:**

1. Powered-industrial trucks are used in all phases of production, assuring a smooth and dependable flow of materials at all times and eliminating costly delays.

2. Metal stacked in unit loads permits fork trucks to tier pallet loads four-high, cutting in half the space needed for storage.

3. Truck maintenance costs have been very low; down-time has been negligible.

THIS IS NOT AN ISOLATED CASE. Similar savings have been made in all types of industries. Ask your industrial truck sales engineer for information about case histories in *your* industry.

THE INDUSTRIAL TRUCK ASSOCIATION

3701 NORTH BROAD STREET · PHILADELPHIA 40, PA.

in developing flavor in certain foods. Various formulas may be compounded within claims of patent, proportion of glutamic acid ranging from 10 to 100 parts for 100 of ammonium glutamate. When glycine is used, proportions of both glutamic acid and glycine range from 10 to 100 parts for 100 of ammonium glutamate. Materials are thoroughly mixed dry and screened through 20-mesh screen. Combined substances are said to develop flavors not otherwise attainable.

Digest from U. S. Patent 2,512,385, issued June 20, 1950, on an application dated Aug. 31, 1949, to D. B. Sabine, Yonkers, N. Y., assigned to The Arlington Chemical Co., New York.

Enameled Tin-Plated Covers Corroded by Electrolysis

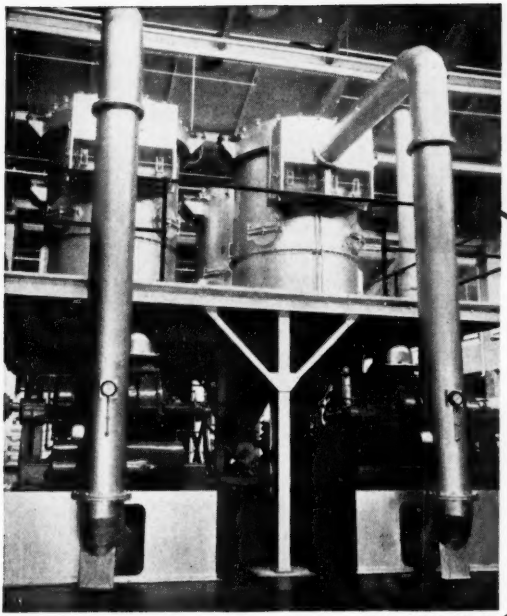
Laboratory investigation of the early occurrence of perforations of enameled tin-plate caps on glass jars packed with vegetable foods has shown the corrosion to be due to electrolysis. A galvanic couple is set up between metal exposed on the inside of the jar as anode, and metal exposed outside the jar as cathode. Current is conducted through the seal, due either to the conductivity of the gasket or of capillary films of electrolyte on the interfaces of the gasket, or both.

Experimental work was performed on 5 soups ranging in pH from 5.13 to 5.93. Two lots of caps were used, both made from the same 4 lots of tin plate but coated with different enamels. All told, about 4,000 jars were packed, 100 for each of 40 variables—2 lots of caps, 4 kinds of tin plate, and 5 products. Storage temperature was about 80 F., and a jar representing each variable was opened for examination after different storage periods. In summary, of the 2,000 A caps, 21.4 percent, and of an equal number of B caps, 3.8 percent were perforated 10 months after packing. Two months later over half of the remaining A caps were perforated.

The following corrective measures are suggested: (1) Omit the enamel coat on that part of the cap covered by the gasket. A cap coated with an unpigmented enamel now under test for 10 months indicates the soundness of this principle. (2) Use a gasket of water-repellent material or one coated with such a material to counteract capillarity, which might cause a film of electrolyte between gasket and cap to reach the outer edge of the latter, a gasket that will not itself conduct an ionic current. (3) Avoid entrapment of a film of food in the seam.

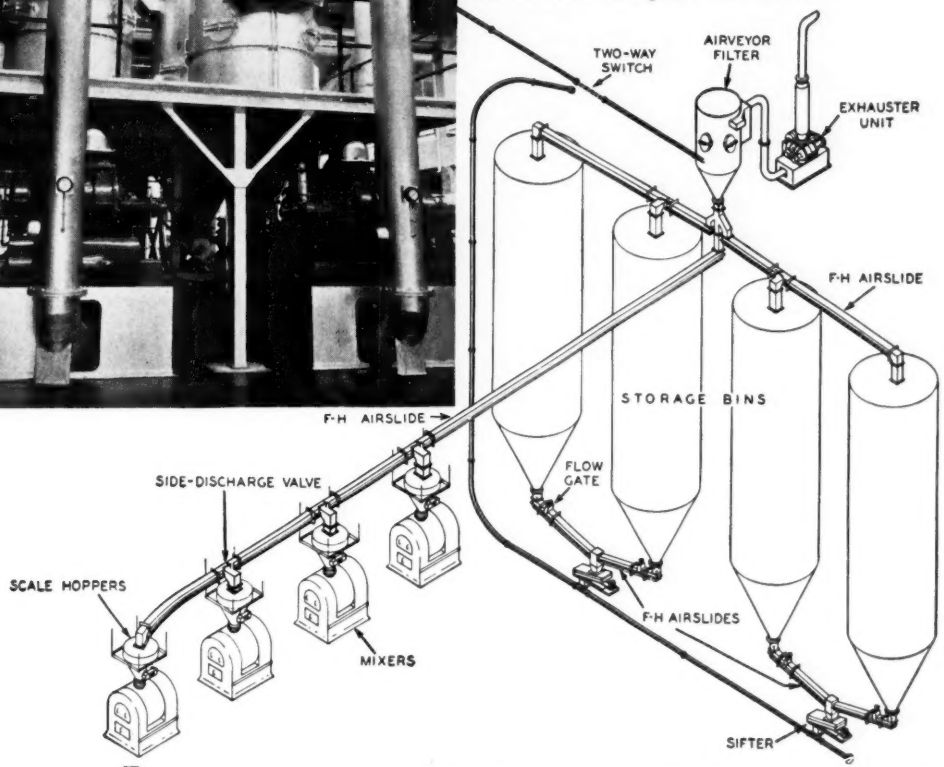
Digest from "Corrosion of Enameled Tin-Plated Covers on Glass Containers," by Edward F. Kohman, *Industrial and Engineering Chemistry*, Vol. 42, 1578-81, Aug., 1950.

(*Turn to page* 145)



NOW FLOUR *flows* FROM MILL TO LOAF

. . . untouched by human hands



More and more the larger baking plants are handling flour in bulk—*flowing* it from mill-sealed hopper-bottom cars, to storage or mixers. With or without sealed cars, it's the cleanest, safest, most economical method yet devised—and it's a one-man, push-button job at the bakery.

The Airveyor and the F-H Airslide Conveyor effect major economies wherever they are installed for unloading and in-plant conveying. They eliminate dusting, reduce manpower, keep down loss.

The conveying system is simplicity itself. There are few moving parts. Maintenance is lower, dependability is greater. The simple duct or pipe system, without sharp turns and pockets, prevents flour accumulation and possible infestation. The system is self-cleaning, and 100% retention of all visible dust is guaranteed.

With manpower shortages, maintenance and operating costs on the rise, it will more than pay you to investigate *flowing* flour. Why not have a Fuller Conveying Engineer analyze your present methods of handling flour and other dry, pulverized food materials? There's no obligation.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS • COMPRESSORS AND VACUUM PUMPS FEEDERS AND ASSOCIATED EQUIPMENT

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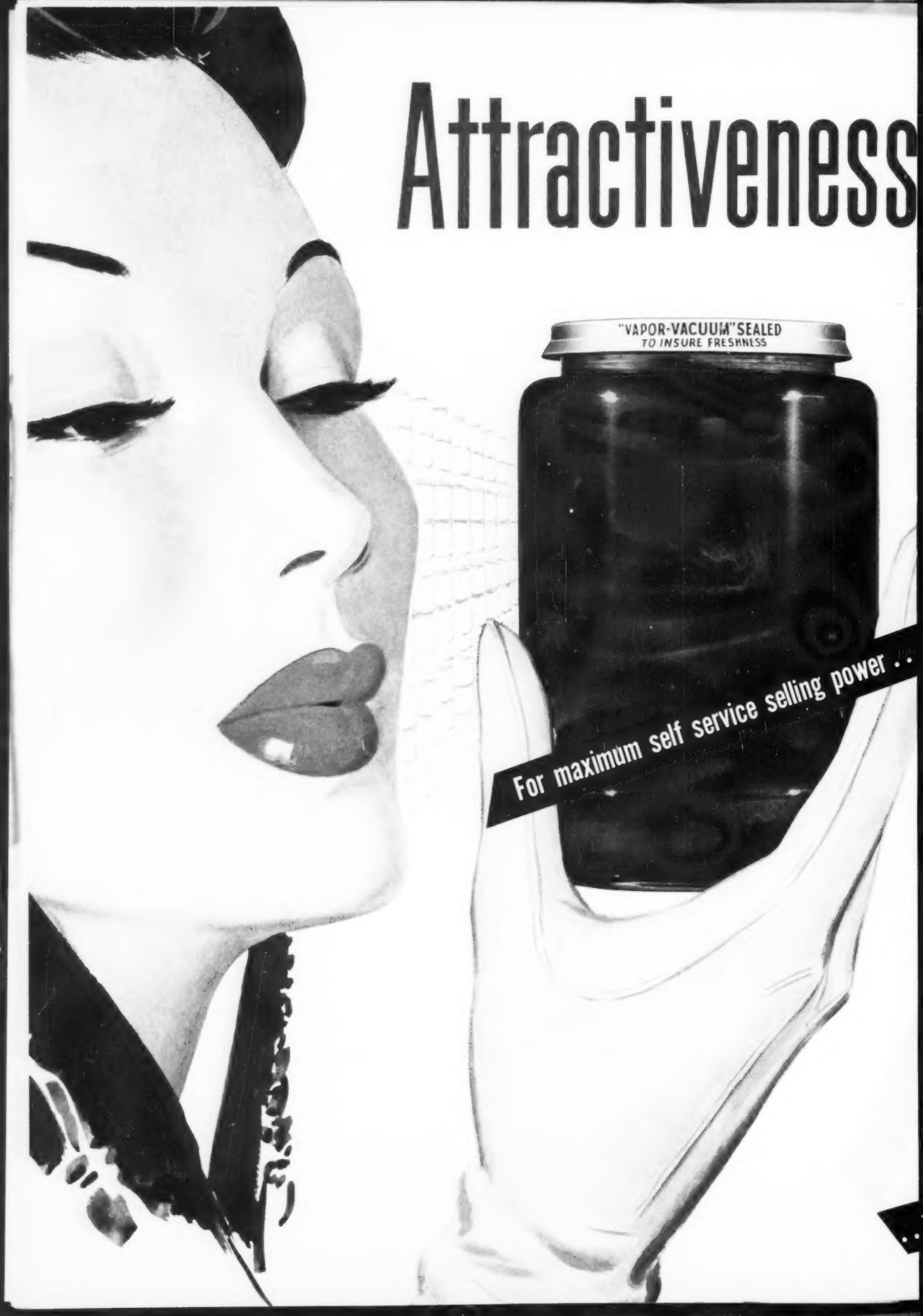
A 122

Attractiveness



alone is not enough!

There was a time, in the dim dead past, when a food package could make sales just by being attractive.

But that was before the days of almost universal attractiveness in food packaging. Under modern conditions—and especially in the modern self-service store—a package needs a lot more than mere attractiveness to win out.

In the rough-and-tumble of self-service competition, a food package must not only catch the eye, but it must *hold it* too! Just consider:

For every package of food on the self-service shelves there comes a certain moment when the chips are really down. That's the moment when a shopper, ready to buy the food this package holds, begins to scan the immediate shelf area.

The shopping eye flicks over the shelves, hesitates, stops. The shopping hand shoots out. And that's that!

Who wins? At this critical juncture, with competition between packages nothing short of brutal, which package has the best chance?

A matter of visibility

The producers of Vapor-Vacuum Seals suggest that the fate of any package, at this point, is very likely to hinge on *the factor of visibility.*

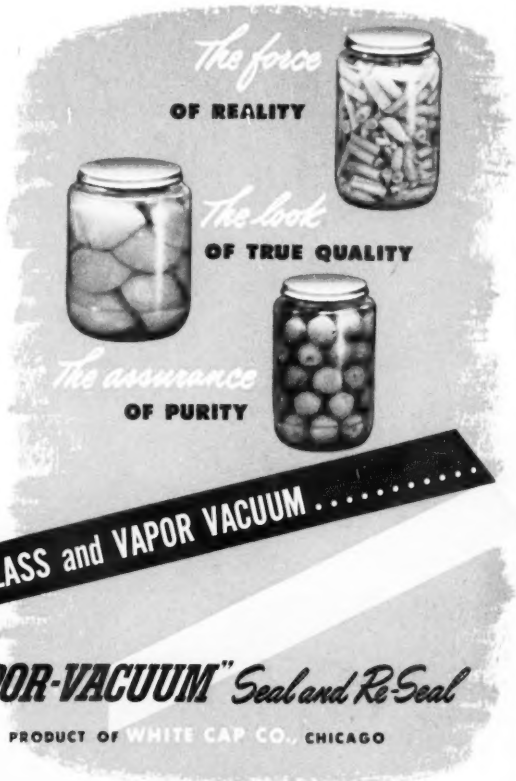
Consider the situation, as represented by two typical food packages, both attractive. *Package No. 1* hides its appetizing contents and offers the shopper only a printed picture. *Package No. 2* makes its contents completely visible. *Package No. 1* asks for a vivid imagination and a willingness to believe. *Package No. 2* simply says, "See for yourself!"

Package No. 1 still may catch the eye at first. But there's no escaping the fact that *when the eye finally stops roaming, it's most likely to rest on Package No. 2.*

The door is still open

The advantages of visibility have already put so much food in glass that further discussion of this point might seem unnecessary. *But the fact is that there are still plenty of opportunities for "hidden" products to come out in the open.*

At White Cap Co., where much of the history of visible packaging has been written, these opportunities are constantly being explored. White Cap know-how on visible packaging is one of the greatest assets the food industry possesses. *As always, this know-how is at the packer's service.*

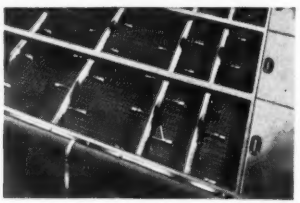


MINUTE MAID CORPORATION Uses Barry-Wehmiller VORTEX Freezer to Speed Frozen Fruit Juice Production with Continuous, Automatic Operation

Illustrated above is a "Vortex" freezer in the Plymouth, Florida, plant of Minute Maid Corporation, one of the country's leading processors of frozen foods. The "Vortex" is entirely automatic in operation and is run continuously with no operators required. Positive control of time and temperature are assured, plus reduced operating costs.

Heat transfer is accomplished by the famous Barry-Wehmiller "Vortex" system of atomized sprays—special spray nozzles provide unvarying heat transfer with a minimum of pump horsepower.

Movement of containers through the freezing process is by the patented "Walking-Beam" conveyor with two moving grates which permit infinite speed changes for varying process requirements. As the forward movement of the "Walking-Beam" never exceeds a four-inch stroke, the conveyor remains at the same temperature as the sprayed solution—no solution is carried out of the cold zone. The "Vortex" saves space, consumes less power, for the hydraulic drive of the "Walking-Beam" dispenses with chains, reducing gears and cam movements—holds friction to a minimum.



View of "Vortex" freezer with top removed showing "Walking-Beam" conveyor grates and atomized spray nozzles.

"Vortex" freezers, coolers, exhaust boxes and pasteurizers have a wide application to many food processes. Write for full information on the "Vortex" model that will cut costs and aid production in your own plant.

See our Exhibit at the Canning Machinery Exposition, Booth 10, Chicago, February 17-22, 1951.

KNOWN THE WORLD OVER

BARRY-WEHMILLER Machinery Co.

BW-240R

4660 W. FLORISSANT AVENUE • ST. LOUIS 15, MO., U.S.A.

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Advances In Technology

—*Continued from page* 140

High Frequency Aids Hops

A high frequency quartz sound-generator of the dipping type (1,000 kc., auditory, at 300-w. energy output) has been applied to hop suspensions with results that indicate substantial savings of the amount of hops required for brewing.

In aqueous extracts the ultrasonic solution of the bitter substances of the hops amounted to 53.8 percent. And by adding first wort to increase the viscosity, up to 87.9 percent of the bitter substance was obtained. The total resins remaining in the hops after extraction amounted to 2-4 percent, of which 60-70 percent was soft resins and 30-40 percent hard resins.

In Pilsener brews, up to 40 percent of the normal hop addition could be spared by the use of suspensions treated ultrasonically. Analysis showed that, whereas in normal hopping a cooler wort contained 26.7 percent of the bitter substance of the hops, worts made with ultrasonic treatment contain up to 90 percent of the hop bitter.

Fermentation and cellar behavior of the experimental worts were normal in all respects. The yeast crop was purer and less bitter tasting than those from normally hopped wort. The finished beer had good chill-proofness, and its hop flavor and aroma were judged fine and without after bitter taste. Since the process is a purely physical one it is acceptable in parts of Germany.

Digest from "Bitter Substance by Means of Ultra-Sound, a Process for Rational Hopping of Beer," by W. Specht, *Brauwelt*, 200-03, No. 11, March 15, 1951.

Pink Grapefruit Concentrate

Concentrated grapefruit juice with a distinctive color suggestive of the pink fruit from which it was derived, has been made experimentally at the USDA Laboratory, Weslaco, Texas.

Production of grapefruit concentrate in Texas has been complicated by the fact that a large quantity of the fruit is pink- or red-fleshed and juice obtained from them has a muddy, unattractive appearance. After a thorough study, the scientists found that incorporation of a small amount of the red grapefruit pulp in the concentrate gave it an attractive pink color and conveyed the mild flavor that is characteristic of this fruit.

Digest from "Frozen Concentrates Made From Texas Grapefruit," 64, Report of the Chief of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration USDA, 1950. —*End*

1901-1951

50th Anniversary

Today, more than ever, you can look to

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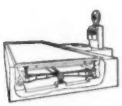
to guard your costs better!

Avoid waste . . . avoid losses through careless handling of food! Tighten your control at every step! See that you have up-to-date scales—and enough scales—throughout your food processing and packing operations! Look into the advantages of Printweigh in stopping losses that originate through human errors. Whatever your problems in receiving, batching, ingredient weighing, packaging, shipping or other weighing . . . operations there's a modern Toledo to do the job with high *accuracy, speed,* and *dependability.*

Today in your community you'll find Toledo as near as your phone; Toledo sales and service offices in more than 200 cities ready to help you in the selection or maintenance of scales vital in guarding your product-quality and costs.

Write for a copy of our 50th Anniversary Brochure . . . helpful information on modern Toledo equipment.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Providing high-production rates in the screening of a great variety of food products, Patterson Screens comply with all sanitary regulations, are of dust-tight design and feature trouble-free, consistently dependable performance. For your most exacting separation needs, consult PATTERSON!

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The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
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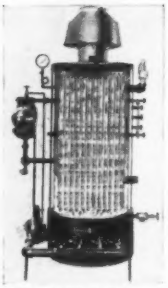
AVOID COMPLICATIONS

There's always . . .

the KANE BOILER PACKAGE



The KANE Boiler, built to ASME specifications. In sizes to 30 H.P.

Here's a truly *"unitized"* steam supply—a compact, self-contained BOILER PACKAGE that is completely automatic . . . requires no attendant and only a bare minimum of floor space. The KANE BOILER PACKAGE includes: the correctly sized Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

Engineered Steam at its best with four decades of experience at your disposal — so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

MEARS-KANE-OFELDT INC.

P.O. BOX 223 -:- BRIDGEPORT, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

Your Air Compressor

—Continued from page 74

piping, without injuring personnel, machines or products.

Safety devices in discharge piping may be of the spring-loaded or fusible-plug types. The latter act as whistle alarms and relieve pressure in the event of high air temperatures. They must be kept clean and in operating condition at all times. Safety valves are usually tested at least once a year and are cleaned during overhaul of the compressed-air system. Well-installed discharge piping safely supplies air, to the receiver, at the correct temperature and pressure.

Do Cushioning Job

Air receivers store high-pressure air for future use, create a cushion in the system, help eliminate vibration, precipitate oil and moisture, and cool the stored air. ASME code governs receiver construction. Working pressure should never exceed that specified by the manufacturer. Satisfactory operating results can be obtained from receivers only when they are properly located, have the required safety devices, and are suitably connected by piping to the compressor and plant load.

Locate air receivers as close as possible to the compressor. This reduces pressure loss between the two units. Never bury receivers under ground. Accessibility is the keynote of good operation and easy maintenance. Annual internal inspection and cleaning of the receiver are specifically recommended.

Fittings Required

All receivers should have an accurate pressure gage, a safety valve, and a drain pipe fitted with a safety valve. Connect drain line to lowest point in receiver to assure proper removal of oil and water. Test the safety valve each year. And drain moisture once a day—more frequently if large quantities are present or if other conditions necessitate.

Piping to the receiver should slope toward any traps installed in the line. If stop valves are needed in the line, a safety valve must be installed near the compressor (between it and the stop valve). Use gate valves in the air line; they prevent accumulation of oil and water in the valve body. Likelihood of moisture collection in the valves is, in this manner, greatly reduced.

Methods described in this article are primary in assuring dependable, safe service in the plant.

End (*Resume reading on p. 75*)

Double Shelf Life

—*Continued from page 39*

out danger of its being eaten with the potato chips. This problem was solved by sealing a mixture of these agents in small cellophane envelopes. The envelopes are perforated in order to allow ample diffusion of the package atmosphere through the activated materials without contact between the contents of the envelope and the potato chips.

This diffusion removes excess moisture and absorbs odors as they develop within the package.

Gordon Foods, Inc., is now using this activated carbon-silica gel packet* to protect the flavor and freshness of all potato chips produced during the hot summer months. As previously stated, tests in Florida markets (conducted last summer) have proved that chips packaged with the protective packet stay fresh and crisp from 10 to 14 days longer than those packaged in the usual manner.

Materials Previously Tested

Finally, for the reader's reference, the following list gives 42 substances which the survey revealed had been tried as antioxidants:

Glycerol
Sugar
Coconut oil
Palm oil
Citric acid
Propyl gallate
Lecithin
Tocopherol
Ascorbic acid
Carotene
Ethyl gallate
Diresorcinol-quinol
Gallic acid
Gossypol
Crude cottonseed oil
Maleic acid
Soybean flour
Gum guaiac
Sesame seed
Cottonseed meal
Phosphoric acid
Cephalin
Hydroquinone
Glycine
Asparagine
Sodium citrate
Sodium malonate
Sodium malate
Ammonium lactate
Sodium tartrate
Pyrogallol
Calcium acid phosphate
Para-hydroxy diphanyl
Aspartic acid
Protein
Oat flour
Vitamin A
Ascorbyl palmitate
Raw coffee
Raw nuts
Oat oil
Galacetonin

* To protect the sponsor, Gordon Foods, Inc., in the development of the activated carbon-silica gel packet, the senior author, Dr. Robert N. Miller of the Georgia Tech Chemical Engineering Department, has applied for a patent on the packet and its applications. The pending patent will be assigned to the Gordon company.

End (Resume reading on page 40)

You owe it to your product to provide the finest wrapping possible . . . the kind you get on Hayssen Automatic Wrapping Machines.

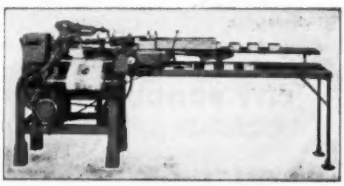
More than 40 years of wrapping know-how and craftsmanship are embodied in every Hayssen. Low in initial cost, mechanically simple, Hayssens keep wrapping costs down.

HAYSSEN MFG. COMPANY • SHEBOYGAN, WIS.

Hayssen
ELECTRIC EYE WRAPPING MACHINES

Descriptive literature on request

WRITE FOR COMPLETE INFORMATION TODAY



tops

in cold storage

Store with 'City Products'

15 NATIONWIDE COLD STORAGE WAREHOUSES

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Federal Cold Storage Co.
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Federal Cold Storage Co.
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Polar Service Company
Decatur, Ill.

North American Cold Storage
National Stock Yards, Ill.

Federal Cold Storage Co.
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St. Louis, Mo.

Springfield Ice & Refrigerating Co.
Springfield, Mo.

Frank Pilley & Sons, Inc.
Sioux City, Ia.

Federal Cold Storage Co.
Kansas City, Kans.

Tulsa Cold Storage Co.
Tulsa, Okla.

Galveston Ice & Cold Storage Co.
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COLD STORAGE DIVISION
33 S. CLARK ST., CHICAGO 3, ILL.

Questions & Answers

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

This Month's Problem

Question — We have been approached by a state-wide chain of concessionaires who are interested in having us pack fresh wieners in 1-gal. jars so that they can steam-heat them for serving in buns. Is there any way we can cold-pack the franks without them becoming too salty?

Answer to May Problem

The Question Was—We've received a number of complaints from consumers on the condition of our frozen hake fillets. In general, the consumers found the fillets dry, stringy in texture, and very coarse. Some declared that the fillets, after they were fried, shrunk to about one-third their original size. Can you tell us what has happened?

Answer—We are not surprised with the complaints you encountered with frozen "Mud or Squirrel Hake", which is not to be confused with the "Silver Hake" or Whiting. Mud Hake does not freeze or store as well as most fresh or salt water varieties. When quick frozen and stored for about three months, Mud Hake is barely palatable.

What may have made your hake fillets even less palatable was carelessness somewhere along the line. It is quite possible that the fillets may have defrosted and were later refrozen. This defrosting and refreezing of the fillets resulted in loss of liquid or fish juice and development of a coarse or fibrous flesh. With repeated defrosting and refreezing, juice will run out. Consequently, when your customers fried the defrosted and refrozen fillets, lack of juice resulted in the objectionable condition they experienced—fillets that were dry, coarse in texture, and about one-third their original size.

Acidifying Dried Eggs

Question—What is the nature of dried eggs that have been acidified, and why are they so treated?

Answer—Liquid whole eggs are acidified to a pH of 5.5 with hydrochloric acid and then spray-dried to a moisture level below 2 percent. The dried eggs are then blended with a small amount of sodium bicarbonate so that the reconstituted dried product can be brought to a more neutral range and thus improve the texture and flavor of the eggs upon scrambling. Packing is done in cans under 20 percent CO_2 and 80 percent nitrogen.

This treatment is employed because the protein-sugar reaction normally occurring in dried whole eggs is definitely retarded at this low pH-level and moisture content.

Preventing "Water Hammer"

Question—In pumping wine from storage casks to our bottling department, we frequently have a water hammer in the discharge line. Is there any way we can prevent it?

Answer—This trouble is caused by sudden changes in the velocity of a liquid column, and it is usually serious in long pipe lines.

You can prevent "water hammer" by starting the pump with the discharge valve closed. Then slowly open the valve to increase the velocity of the wine gradually in the pipe line.

If water hammer gets too bad, it can be prevented by installing a slow-opening and slow-closing check valve, which gradually increases the flow during starting and decreases it during stopping.

More Efficient Cooking

Question—Because of increased sales of our product, our processing capacity has become somewhat inadequate. The bottleneck in our plant operations lies in the cooking operation. Can you suggest ways by which cooking can be speeded in steam-jacketed kettles?

Answer—If your kettles are not equipped with steam traps, by all means install traps to assure removal of condensate from the jackets as fast

as it forms. If condensate backs up in the jackets, as it does without traps, the effective heat transfer area of the kettle wall is reduced. In other words, part of the jacket is filled with water, which prevents the steam from contacting all of the kettle wall.

If the kettles are large, you may want a trap on the condensate discharge line of each kettle. If the kettles are small, one trap for a group of kettles may suffice.

To achieve the utmost in rate of heat transfer and maximum economy in fuel utilization, you should install condensate-return pumps. By returning the hot condensate, you reduce the heat load on the boiler and save fuel.

You should also consider installation of automatic temperature controllers on your kettles, not only to speed cooking but to save labor on the part of kettle attendants.

Finally, mechanical agitation of the kettle contents while cooking will speed heat transfer from the kettle walls through the mass of the product.

Chocolate-Enriching Problem

Question—Is it permissible to add vitamins A and D to chocolate for coating centers?

Answer—According to the Food & Drug Administration's Definitions & Standards of Identity for Cacao Products, vitamins cannot be added to a chocolate bar (milk or dark sweet) without a center. But, according to these definitions, you can fortify chocolate-covered creams with vitamins. And these vitamins can be added to the center or even the chocolate coating.

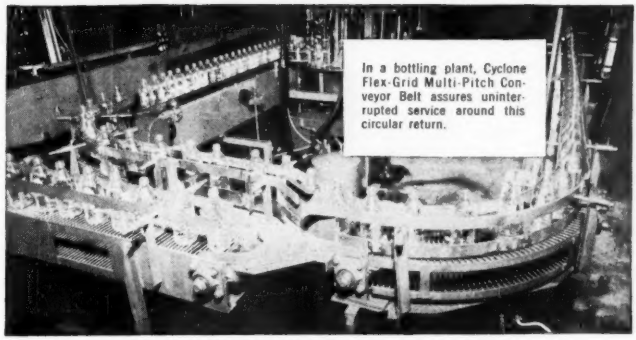
However, before proceeding to enrich chocolate-coated centers, we suggest that you contact the F&DA of the Federal Security Agency, Washington, D. C.

Why Salmon "Honeycombed"

Question—On one occasion, we found something strange in our canned-salmon pack—the flesh of the fish was perforated by small holes. Can you explain this condition?

Answer—What happened was this: You packed some salmon that had undergone "honey combing" decomposition. Gas-forming microorganisms produced gas in the flesh of the fish, and this gas expanded and formed little pockets in the flesh during processing. Then, upon cooling, these pockets remained and the flesh appeared filled with small air spaces. Hence, the term "honeycombing."

This condition is not restricted to salmon, for it may also be found in canned mackerel, sardines, or tuna.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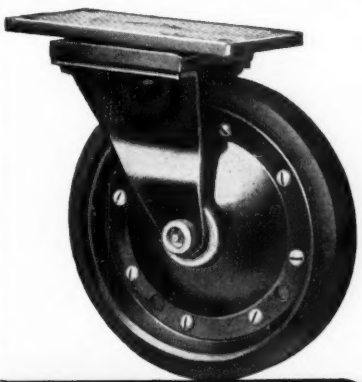

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THE CHEMISTRY AND TECHNOLOGY OF FOOD AND FOOD PRODUCTS, *2d edition, Vol. 1. Edited by Morris B. Jacobs. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. 832 pages; 6¾x10 in.; cloth. Price,* $12.

THE CHEMICAL ANALYSIS OF FOODS AND FOOD PRODUCTS. *2d Edition. By Morris B. Jacobs. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y., 1951. 902 pages; 6½x9¼ in.; cloth. Price,* $9.

As for the first named book, no attempt can be made here to compare the revised edition of such a vast work with its original, published in 1944.

All chapters have been rewritten by the editor or one of his 38 collaborators in the light of progress made during the past seven years. New chapters have been added covering such topics as use of instruments in the food plant, essential oils, the manufacture of chewing gum, and the use of enzymes in food production.

The book is divided into three volumes. This first volume is made up of three parts covering fundamentals, unit operations and processes, and sanitary quality control. The remaining two volumes are scheduled for an early appearance.

Turning now to the second named book: Dr. Jacobs has put in a busy year, what with editing a three-volume treatise and also rewriting this work.

Developments in the analytical methods of the food chemist advanced since 1938 are discussed here, along with the coverage of the basic material that appeared in the first edition.

The scope of the book has been enlarged, according to the author, to serve practically every aim of the food chemist. These aims include: Development and enforcement of stanards of identity, purity or value; problems of decomposition under either normal or abnormal storage conditions; studies designed to improve or control the quality of natural or processed foods; determination of the nutritive value of foods for scientific, dietary or labeling purposes; technical control of foods being processed; technical control of raw materials being purchased; and problems of a toxicological or forensic nature.

Handbook for Engineers

MECHANICAL ENGINEERS' HANDBOOK, 5TH EDITION. *Edited by Lionel S. Marks. Published by McGraw-Hill Publishing Co., 330 W. 42nd St., New York 18, N. Y., 1951. 2,236 pages; 6x9¼ in.; composition. Price,* $15.

Developments in the field of mechanical engineering during the turbulent 1940's have been numerous and important. And many of the developments relate directly or indirectly to the food field.

This fifth edition—the fourth appeared in 1941—of one of the best handbooks of its kind, attempts to incorporate the more important parts of the new materials.

Among the new or greatly modified items are:

Fluid mechanics, radiant or panel heating, heating by heat pumps, vapor-compression distillation, high vacuum pumps, dust explosions, industrial supersonics, automatic process control, quality control, ferrous and non-ferrous alloys, plastics, silicones, adhesives, fibers, and reflective heat insulation.

As in the previous editions, the book's precise descriptions, fundamentals, formulas, methods, tables and diagrams offer valuable sources of engineering information for the non-professional user as well as for the practicing engineer.

Fats and Oils

CONTINUOUS PROCESSING OF FATS. *By M. K. Schwitzer. Published by Leonard Hill Ltd., 17 Stratford Place, London W. 1, England,* 1951. 354 *pages; 6¾x8¾ in.; cloth. Price,* 30*s.*

This is a well-rounded English treatise on vegetable and fish oil processing. The author discusses established practices, along with recent trends and developments—particularly where methods have attracted technological attention.

New technics also are compared with

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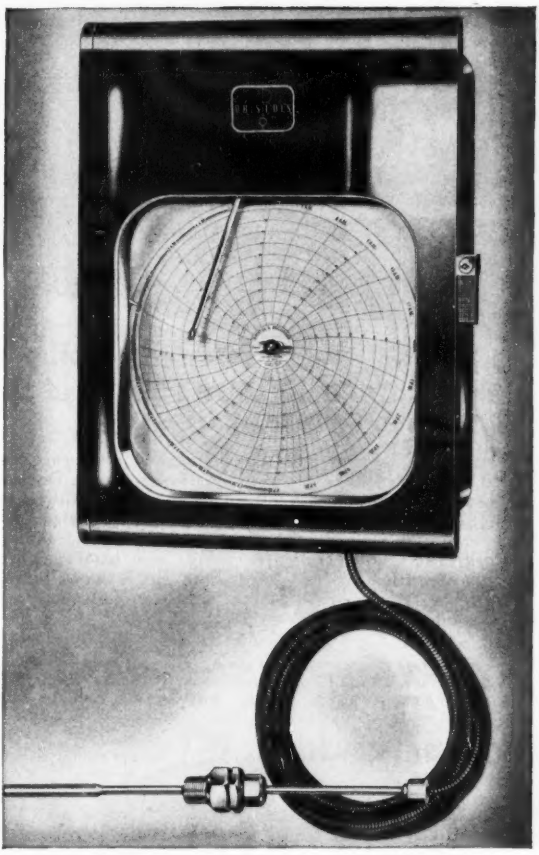

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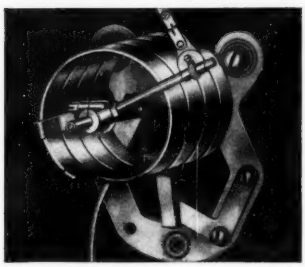

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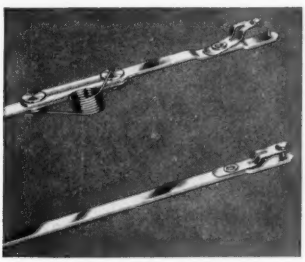

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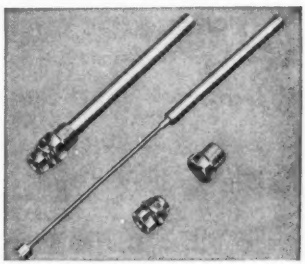

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older practices from an economic standpoint, when such comparisons appear useful.

While the author has not aimed at presenting a complete guide for the fats and oils industry on either side of the Atlantic, he has followed developments in the U. S. as well as in Great Britain. The result is a useful text for those interested in this branch of food processing.

Government Publications

CURING OF FISHERY PRODUCTS. *By Norman D. Jarvis. Fish and Wildlife Service. Research Report 18. Price, 60c.* This report is a reference handbook on the problems of fish curing. It includes information from recent technical studies of the principles on which fish curing is based, discusses improvements in methods and equipment, and describes the standard methods.

These recently issued documents are available at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the Bureau responsible for its issue.

WAGE SUPPLEMENTS. *The Nonwage Labor Costs of Doing Business. Chamber of Commerce of the United States of America, Washington 6, D. C. Price 50c. (bulk orders from 5 to 50 copies at 40c. each; 50 copies or over 30c. each).* Two years ago, the economic research department of the National Chamber turned out what is believed to be the first comprehensive study of nonwage labor costs for a cross section of American industry. Now comes this new survey, which has two chief aims: To provide up-to-date information on changes in nonwage labor costs occurring in the past two years, and to provide more extensive coverage and greater detail than was possible in the first study.

FISHERY STATISTICS OF THE UNITED STATES 1947. *Fish and Wildlife Service, Statistical Digest No. 21. Available from Superintendent of Documents, Washington 25, D. C. Price $1.00.* Gives complete data for continental United States and Alaska with figures for primary catch and for yield of manufactured products and by-products, including data on employment and other economic factors. This is the latest annual volume distributed in February 1951.

—*End*

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Fats to Fit Your Mixes

—*Continued from page* 113

an advantage of being a fatty food and a natural product.

Alpha tocopherol is recommended by some as a fat antioxidant. We have not had too much luck with it, however, in commercially produced fats. Some also have tried ascorbic acid. Here, again, we have had little luck.

Natural Antioxidants

There are natural antioxidants in prepared cake mixes. This is an extremely important thing to remember, because mix people very often ridiculously go out on a limb and ask for analytical fat-stability figures.

Some mix people might want shortenings that have a 300-hr. A.O.M. (Active Oxygen Method) stability figure. This type of shortening can be made, but using it is like trying to drive a jet plane down the highway to Chicago. You can only go at the speed of your traffic. And a mix will usually be consumed long before any of the fats commercially produced can become rancid. The only occurrence of rancidity in the mix business is that attributed to soakage of pie crust.

Natural antioxidants in the mix, like spices, are very effective. There is no better antioxidant than ginger. It is by far the most effective antioxidant that can be added directly to the fat, or, in the form of spice, to the mix.

Sugar is a pretty good antioxidant, and so is flour. In pie crust, unbleached flour does wonders for fats of extremely low stability. People in the pie-crust business used merely unbleached flour and plain lard before antioxidants were known—with practical immunity from rancidity, provided they could eliminate carton rancidity.

Fat Hydrolysis

There is another problem that occurs in mixes—the hydrolysis of fats. Present in flour are certain lipolytic enzymes which hydrolyze the fat. Certain fats are more subject to hydrolysis than others. For example, coconut oil mono- and di-glyceride should not be used in shortenings because hydrolysis would thus be greatly accelerated. And through this hydrolysis, baking properties would be sacrificed, and at the same time soapy, offensive flavors would develop.

In the manufacture of fats for mixes, it is necessary to wash out any alkaline material which would catalyze the hydrolysis of fats. And the fats should not have any trace of

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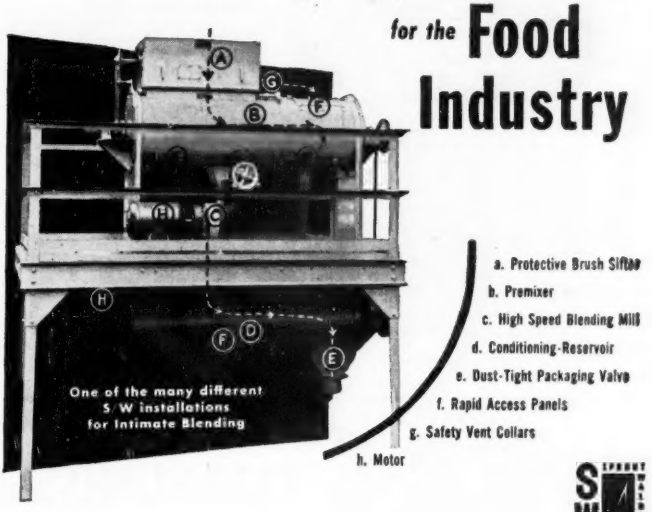
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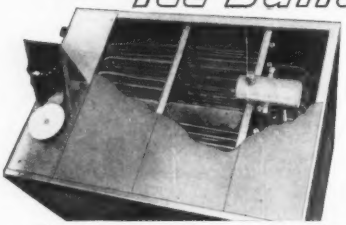

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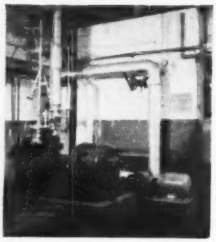

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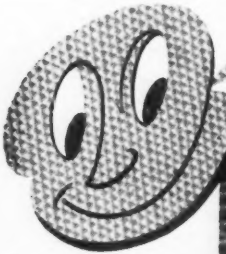

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soaps. If anything, the citric acid type of stabilization of all fats should be employed to make sure of removing trace alkalies. Trace metals have some catalytic influence, and for that reason they should be kept low.

Of course, the free fatty acid content of the fat should be as low as possible. For, as the free fatty acid increases, the rate of hydrolysis is accelerated. It should be particularly noted that if you make either alcohol or chloroform extractions from a mix and run the KOH-titration on either fraction, you will find that the extractable fatty acids increases as the mix ages. If that increase is extremely great, you will also find baking properties sacrificed.

The cake-mix fat should provide quick creaming qualities, good cake volume, symmetrical cakes, and a high degree of foolproofness. If these properties are built into your cake-mix shortening, some of the rest of the problems will take care of themselves.

The above article is taken from a paper presented by the author at the recent Midwest Conference of the American Assn. of Cereal Chemists held in Springfield, Ill.

End (Resume reading on p. 115)

Operating Under CMP

—Continued from page 150

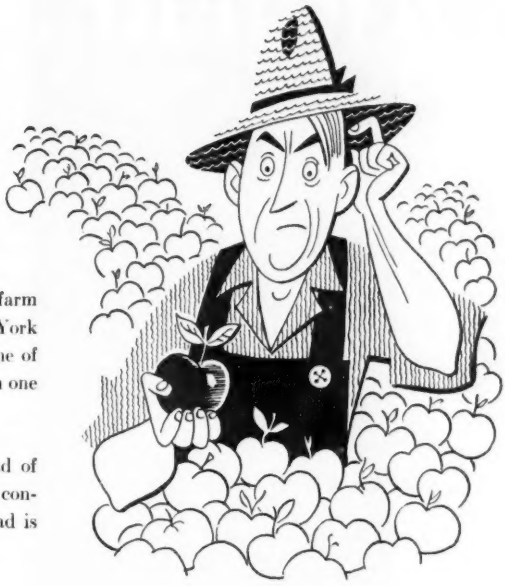
chief and the director of OMF. It then goes through a somewhat similar procedure in NPA. There it goes first to an industrial specialist, then to the director of the Machinery & Equipment Division. And the latter checks it with a controlled materials division.

If the manufacturer has received more rated orders than his allotment allows, he may apply for an additional allotment rather than wait until his next quarter's allotment is authorized. This is feasible where extreme hardship to an essential industry is involved, provided the overall industry allotment will stand it. Because of the careful screening as to essentiality of each application, even as many as the 25 extra filling machines might be "allotted" to a given manufacturer.

The above procedure may get the processor his filling machine, but let's see what happens to his application. The manufacturer originally received an authorized controlled materials allotment to build that machine as a result of his CMP-4B application. As a primary consumer, he therefore uses the DO rating given him by the proc-

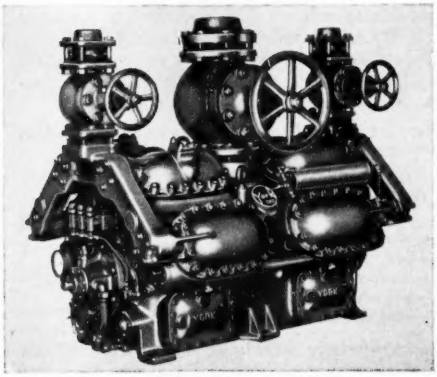
(Turn to page 176)

How you gonna KEEP 'em down on the Farm?



The best way to keep apples in storage, down on the farm or anywhere else, is by York refrigeration. Recently York V/W Ammonia Compressors were selected to cool one of the largest apple storage rooms in all Pennsylvania on one of that state's finest farms.

In the fall when the fruit is harvested, a peak load of refrigeration is required to keep these apples in good condition for marketing. In other months when the load is light, a lesser amount of cooling is needed.



YORK'S V/W AMMONIA COMPRESSOR. Available in 4, 6, 8, 12, 16 cylinders. With low initial cost . . . low operating cost . . . low maintenance cost.

The flexible York V/W Ammonia Compressor does both jobs easily. Unlike machines with fixed capacity, York's power consumption varies in almost direct proportion to product load . . . with power savings up to 72% at 25% load.

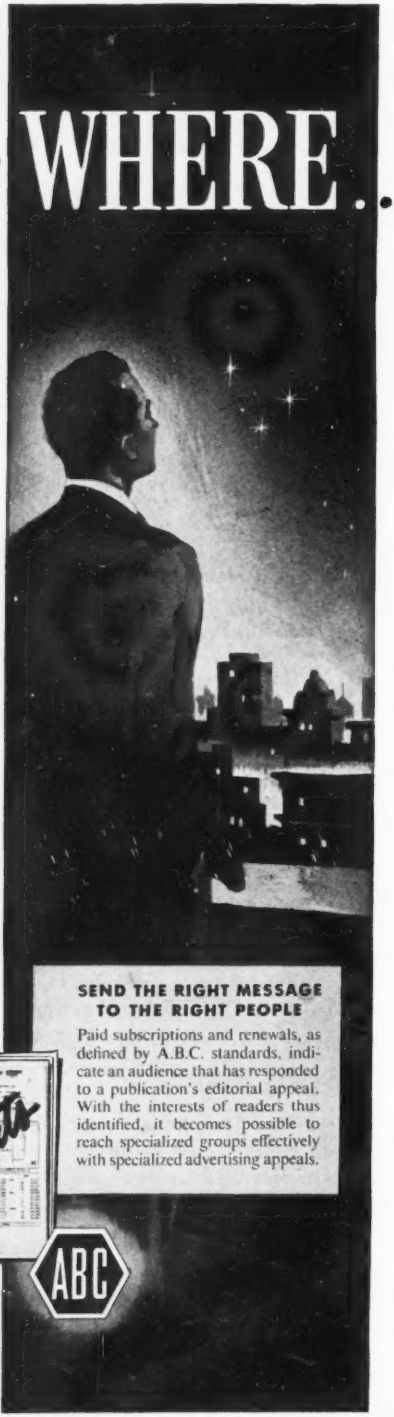
Compact, easy-to-maintain York V/W Ammonia Compressors can't wear out . . . all parts subject to wear are easily renewable. York's dynamic and static balance assures you of smooth, quiet, vibration-free performance. Equally adaptable for booster or high stage operation.

Whether you need refrigeration for processing or for storing, York can supply the equipment to serve you best. Check with your York Representative (listed in your Classified Directory) or write York Corporation, York, Penna.

York refrigeration air conditioning

The big advances come from YORK

Headquarters for— **Refrigeration and Air Conditioning**



Oh! WHERE... *is my wandering ad tonight?*

THERE are two ways to buy advertising space. One is the guesswork-opinion method. The caption above is the mournful song of an advertiser who is still selecting media the way it was done before World War I, when there were no standards for the circulations of published media and when there was no accepted and approved method of auditing circulations. In those days, advertisers O.K.'d their proofs and sent out their advertising with a prayer that some of their sales messages would find their way to market.

The other way to buy space is the factual, know-what-you-get-for-your-money method. Today advertisers can start their investments on a basis of facts by selecting media with the help of the information in the reports issued by the AUDIT BUREAU OF CIRCULATIONS. This cooperative and nonprofit association of 3300 advertisers, advertising agencies and publishers, organized in 1914, has established standards that make it possible to evaluate the circulations of published media. The A.B.C. maintains a large staff of experienced and specially trained circulation auditors who make annual audits of the circulations of publisher members. A.B.C. reports give the facts thus obtained.

Here are some of the audited facts about business papers that A.B.C. reports tell the advertiser:

—how much paid circulation;
—how much unpaid;
—an occupational or business breakdown of subscribers;
—where they are located;
—how much subscribers pay;
—whether or not premiums are used;
—how many subscribers are in arrears;
—what percentage of subscriptions are renewed.

Those who buy advertising on the basis of this factual information, as given in A.B.C. reports, do not have to speculate about the distribution of their sales messages. They KNOW where and to whom their advertising goes. That is why this business paper is a member of the AUDIT BUREAU OF CIRCULATIONS. Ask for a copy of our A.B.C. report and then study it.

SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate an audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.

ABC

McGRAW-HILL PUBLICATION

A.B.C. REPORTS—FACTS AS THE BASIC MEASURE OF ADVERTISING VALUE

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Ultrasonics Put to Work

Industrial application of ultrasonics has long intrigued food processors. Now comes word of significant progress.

Paper mill waste water is now to be treated with ultrasonic energy—to remove particles of suspended fiber in the first trial industrial application of ultrasonic equipment. Brush Equipment Co. Cleveland, pioneer in the ultrasonic field, has discovered that many of the desired ultrasonic reactions appear to take place only in the presence of cavitation within the process medium. From observation it is pretty well established that such reactions as emulsification, disruption of pathogenic bacteria, ultrasonic cleaning, sterlization and other similar reactions take place efficiently only when conditions permit cavitation.

Other reactions such as floceulation, accelerated bacteria growth, internal heating and effects on crystalization and precipitation take place in the absence of cavitation.

Brush's activities in the ultrasonic field have been limited exclusively to liquid and solid phase applications. The company is currently offering pilot plant sized hypersonic equipment consisting of the electronic generator and transducer for a figure under $10,000.

Three-Ply Packaging Forum

The 13th Annual Forum of the Packaging Institute is to be based on a "Guns *and* Butter" theory, according to Herbert T. Holbrook, of Standard Cap & Seal Corp., chairman of the Institute's program committee. Meetings will be held October 22 to 24 at the Commodore Hotel, New York.

Packaging problems arising from government controls, competition of government claimant agencies other than the Military & National Production Administration, and the supply situation and outlook will be reviewed Monday, October 22, under the direction of Mr. Holbrook, who has been close to the subject since World War II days when he was in charge of ordnance packaging and packing.

Robert deS. Couch, of General Foods Corp. and vice president of the Packaging Institute, will supervise a discussion, Tuesday, Oct. 23, on the technical problems of packaging.

Production topics will highlight a program to be directed by John A. Warren of the Engineering Department of American Home Products Corp., Wednesday, Oct. 23.

Seminars totaling one day each on petroleum products and chemical packaging, and drug and pharmaceutical packaging will occupy the second and third days.

Fresh Milk to Korea

Noting the diverse reception, in the east and midwest, to competitive sales tests of concentrated (3-to-1) milk, Borden's last month went off on a new track when it revealed a shipment of concentrate by air to our armed forces.

Departing from simple refrigeration used for 3-to-1 concentrate in the tests, Borden's froze the product before shipping in insulated packages packed in dry ice. Consigned to the Navy, the shipment went from Chicago to Oakland, Calif., in a cargo airliner. Relayed from Oakland, the shipment could provide fresh milk to the troops in Korea within a few days of processing.

Break Citrus Price

A minor price war between Florida citrus growers and concentrators flared as the 1950-51 season wound up. Snow Crop reduced its offering price for late Valencia by 60c. a box under the $2.35 minimum set by the growers' organization, Florida Citrus Mutual. Pasco, the largest Florida concentrate producer, followed a day later.

While the quantity involved was very small—only 750,000 boxes—the flareup indicates that concentrators are not going to get squeezed as they were a year ago if they can help it. At that time, grower price of $3.50 a box sent the retail price of concentrated orange juice to as high as 33c. a can. But consumers balked at the price leaving heavy inventories all along the line.

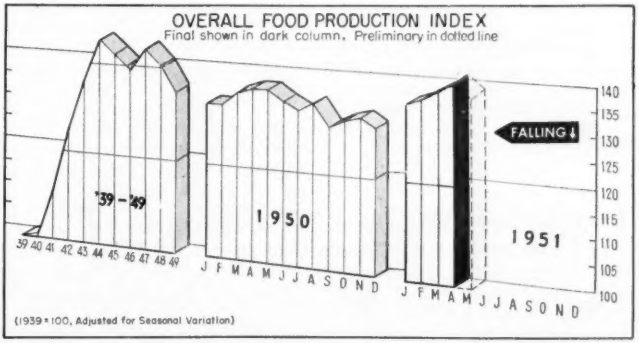
Growers were concerned with what would happen to next year's price picture in the face of this last minute breakdown. In their ears was still echoing the statement of John T. Lesley, general manager, Florida Citrus Exchange, that they must expect lower profits next year. They were also remembering the price suggested by processors at the beginning of this past season—$1.42½ a box.

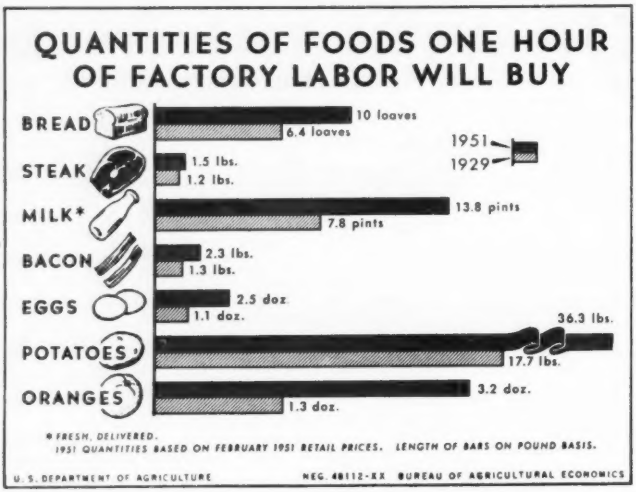
Against Hormone Diet

Use of diethylstilbestrol for hormonizing chickens, under present conditions, is against public interest, in the opinion of Robert K. Enders, chairman, department of zoology, Swarthmore College.

Appearing as a witness at the Delaney hearings, Dr. Enders said that a dogmatic stand would be foolhardy in the present inconclusive stage of research, but there is evidence that enough of the drug can be ingested, by eating treated chickens, to cause changes in the human reproductive tract.

Examinations of samples of hormonized chickens on the market, he said, indicated that about 16 percent show evidence of diethylstilbestrol implantation in marketed portions of the bird rather than at the base of the skull as recommended. He concluded that further research is called for.





Lagging Food Prices

A good look at this USDA chart might lead to the belief that food prices are falling right through the bottom of the economic barrel. But it does provide effective evidence that food prices, as usual, are lagging behind. (Wide World.)

Candy Output Revives

Preliminary analysis of 1950 candy production indicates that national output may have exceeded every other year except 1944, when the total was more than 2,800,000,000 lb., according to George F. Dudik, industrial economist on the NPA staff.

Discussing the preliminary figures before the National Confectioner's convention, he said that the industry, dollarwise, probably did not reach the 1948 mark of $1,000,000,000, but that 1950 sales did come close to the 1947 figure of $956,000,000.

Package goods sales rose about 10 percent in both poundage and value during 1950 as compared with 1949, Mr. Dudik revealed. Chocolate covered bulk candy together with non-chocolate bulk poundage rose in about the same proportion. Chocolate covered bar goods achieved a stable level of sales after serious declines during the previous two years. Non-chocolate bars, on the other hand, increased 17 percent over 1949 in poundage and 19 percent in dollar value. Decline in penny goods continued with a 1950 drop of nearly 7 percent.

Cans Getting Tight

Food canners feel that even if third-quarter allocations of steel for cans meet the enlarged second quarter figures, it may not be enough. Neither food canners nor can makers are happy about the second-quarter allocations.

National Canners Assn. spokesmen say that can manufacturers have not been provided with enough steel to meet demand, and thus have taken over allocation of tin cans to their customers.

It was the intention that some cans would be left over for "B" preference items and items under quota, but canners may not have enough cans to pack even the high-preference perishables.

Warm-Hard Chocolate

Reporting development of an armed forces chocolate bar that will not melt at 120 deg. F., Kenneth T. Farrell, QM Food & Container Institute, has urged candy makers to alter, for the sake of practicability and variety, so-called secret formulas in brand name products destined for military production.

Addressing the 68th annual convention of the National Confectioners' Assn., Dr. Farrell emphasized the continued need for research by the candy industry because service men in Korea want more fudge, more coconut bars, nut rolls, carmel-nougat bars, carmels, and chewy chocolate rolls. And, he added, they want fewer hard candy rolls, chocolate bars, and fewer starch jelly disks, all of which though good are difficult to eat when cold.

Soy protein, brewers yeast, and sweet whey have improved candies made for the military, L. F. Martin, Southern Regional Retail Laboratories, told the confectioners. Intensified research is now under way, he said, and noted as an example the finding of approved antioxidant and better storage methods that greatly lessen the deterioration of butter and vegetable fats. As a result larger quantities of fat-containing candies can now be included in military rations.

Materials for making candies will be in ample supply, for the most part, James A. King, Nulomoline Division, American Molasses Co., reported. A few exceptions are fruit acids, such as citric and tartaric acid, water soluble gums and Maraschino cherries.

Test Preserve Sweeteners

As little as 15 percent of such sweeteners as dextros monohydrate and corn syrup solids, used to replace sucrose in strawberry preserves, was detected by a taste panel in tests conducted by Arthur D. Little, Inc., Cambridge, Mass.

Reported by Robert L. Swaine at the 11th annual convention of the Institute of Food Technologists, the tests revealed that preserves sweetened entirely with sucrose were considered sweeter than those prepared with partial replacements. When 25 percent or more of sucrose was replaced by a commercial dextrose monohydrate, or when 15 percent or more of the replacement was made with corn syrup solids, the panel could detect the difference.

Sponsored by Sugar Information, Inc., the work was conducted for four months on preserves prepared on a laboratory scale. Other tests showed that variations in acidity were not correlated with the percentage of replacement sweeteners. Physically, the preserves conformed with legal standards.

Sauerkraut Getting Better

Sauerkraut is better than ever, was the conclusion of a group of food scientists at the Geneva, N. Y., Experiment Station, after completing a survey of 130 samples of commercially canned sauerkraut purchased on the open market. These samples were compared with a similar survey made in 1932 and again in 1940, with the current samples scoring noticeably higher in quality, Vitamin C content, and flavor.

A summary of the findings is presented in *Farm Research*, the Station's quarterly magazine.

"Among the 130 cans of kraut examined, the salt content varied from 1.29 to 2.52 percent with an average of 1.77," states the report. "This is in contrast to variations from 0.7 to 3.4 percent recorded in 1932 and from 1.3 to 3.5 percent in 1940. Soft kraut and pink kraut caused by using too little or too much salt, respectively, are now rarely found in commercial sauerkraut."

Station food scientists observed a marked relationship between color, flavor and quality of kraut. When kraut is eaten raw, it is desirable to have it as much like raw cabbage in crispness, brightness, and light color as possible.

Thus far, however, no satisfactory color standard for sauerkraut has been defined. Station workers are now attempting to measure color differences in kraut with the Hunter color difference meter as an aid in improving still further the processing and handling of commercial sauerkraut.

Canners Directory Out

The 1951 *Canners Directory*, compiled and published by the National Canners Assn., came off the press in June. Canning firms and their headquarters addresses are listed by states along with plant locations and products packed in each. Also given are the memberships of the National Food Brokers Assn. and Canning Machinery & Supplies Assn. The book features an over-all Commodity Index covering 495 different canned products.

The Association furnishes one free copy to each of the NCA member firms, but otherwise the directory sells for $2.50 per copy. Orders are handled by the Information Division, National Canners Assn., 1133 20th St., N. W., Washington 6, D. C.

manufacturers of
seasoning products should...

taste
test
try

SPISORESINS

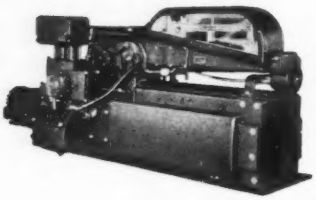
The newest advance in the art of
flavoring and the science of seasoning.

Spisoresins are special extractions of dry spices possessing all the flavor qualities and values of dry spices. Spisoresins produce a more uniform and finer flavor than dry spices and are also more economical to use and handle. Spisoresins meet the requirements of the Bureau of Animal Industry.

D&O ESTABLISHED 1796
DODGE & OLCOTT, INC.
180 Varick Street • New York 14, N. Y.
ATLANTA·BOSTON·CHICAGO·CINCINNATI·DALLAS·LOS ANGELES·PHILADELPHIA·ST. LOUIS·SAN FRANCISCO
ESSENTIAL OILS • AROMATIC CHEMICALS • PERFUME BASES • VANILLA • FLAVOR BASES

W&T MERCHEN WEIGH FEEDERS

Give Greater Product Uniformity



Weigh-blending of food ingredients—the only *accurate* way to blend—calls for precision equipment and "know-how".

W&T Merchen Weigh Feeders meet the first of these requirements with these features:

- Feed and weigh in *one* operation
- Handle ounces to hundreds of pounds per minute
- Manual or automatic control
- Easy accessibility
- Handy feed register
- Meet underwriters class II group G specifications

Your W&T Engineer brings you the "know-how" from his experience in designing and supervising hundreds of Merchen Weigh Feeder installations.

Write today or see your W&T Engineer.

M-14

WALLACE & TIERNAN COMPANY, INC.

NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

Canned Fruit Set-Aside

Sub-Order No. 2 to Defense Food Order No. 2, establishing the amount of the 1951 canned fruit pack which must be set aside for defense use, has been announced by Acting Secretary of Agriculture Clarence J. McCormick.

Defense Food Order No. 2, announced April 13, authorizes and provides for set-asides of processed fruits and vegetables for defense use. Sub-Order No. 1 to Defense Food Order No. 2 also announced April 13, 1951, establishes the 1951 pack of canned vegetables to be set aside for defense.

Total set-aside requirements under this order amount to approximately 16 percent of the "base period" packs of the following canned fruits:

Fruit	Set Aside Percentage	Requirement in Terms of Cases of 24 No. 2½ Cans	Base Pack Period
Apples	24	1,057,400	1950–1951 season
Apricots	26	951,900	1950
Blackberries	28	137,000	1949
Blueberries	10	90,200	1949
Cherries, RSP	25	959,300	1950
Cherries, Sweet	27	195,900	1950
Figs, Kadota	41	203,100	1950
Fruit Cocktail	14	957,500	1950
Peaches	15	2,456,600	1950
Pears, Bartlett	14	890,100	1950
Pineapple	13	1,417,100	1950–1951 season
Pineapple Juice	12	958,100	1950–1951 season
Purple Plums	26	428,700	1949

Boost Frozen Rhubarb

Frozen rhubarb outscored water-packed rhubarb on all counts in tests carried on at the Experiment Station, Geneva, N. Y.

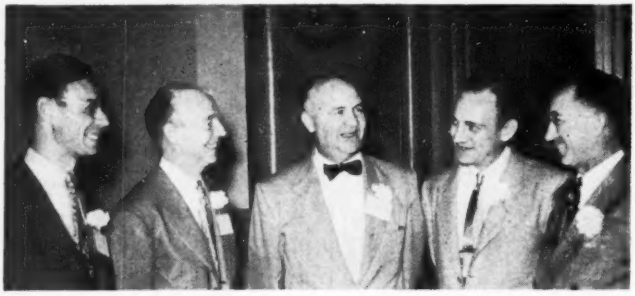
Rhubarb has long been preserved by putting cut stalks into quart jars, allowing cold water to run over them for a while, then covering the jars and storing in the basement. Rhubarb preserved in this manner has been compared with that preserved by freezing in tests at the station. In all instances frozen rhubarb has proved definitely superior to the water-packed product.

Frozen rhubarb was handled in different ways. One lot was washed, cut into inch-long segments, packed, and frozen. A second lot was washed, cut into one-inch segments, scalded in boiling water 1½ min., cooled, packaged, and frozen. A third lot was handled in the same manner as the second, except that it was covered with 65 percent sirup and then frozen. Still a fourth lot was cooked in the sirup, drained, packaged, and frozen.

After six months' storage at 0 deg. F., samples of all the frozen lot were cooked, except for the fourth treatment which was merely thawed, and compared with a cooked sample of water-packed rhubarb. A number of persons compared the different lots and were unanimously in favor of the frozen rhubarb regardless of how it had been treated. Water-packed rhubarb was rated definitely inferior in flavor.

QM Misunderstanding

Office of the Quartermaster is disturbed over an apparent misunderstanding of its published food product requirements. As printed, requirements for all armed forces for the



They Head AACC

New officers of the American Assn. of Cereal Chemists held still long enough to permit this picture to be taken at the Minneapolis convention. From left: F. R. Schwain, Proctor & Gamble Co., secretary; J. A. Anderson, Grain Research Lab., president-elect; H. K. Parker, Wallace & Tiernan, president; D. B. Pratt, Jr., Eckart Milling Co., treasurer; and W. F. Geddes, U. of Minnesota, editor.

fiscal year ending June 30, 1952, are listed by items in millions of pounds. Keyed to this list are designations: "Q" for purchase on a quarterly basis; "A" for purchase on an annual basis; and (-) for purchase as required to meet requisitions.

The impression has been created that items designated "Q" represent the requirements for each quarter. This is not the case. The amounts given are the total requirements for the entire fiscal year, the designation indicating merely that the foods are to be purchased on a quarterly basis.

(*Turn page*)

Hors d'Oeuvres

• Sawdust, according to General Electric, may some day be practical food for cattle. Yea, but will the cattle still be a practical food for us.

• *A pneumatic package that permits an egg to be dropped unharmed from an airplane may soon be marketed commercially, says an instructor at Illinois Tech. Might have to scurry around a bit to find commercial customers wanting this kind of delivery.*

• Bakers are out to slay the notion that bread is fattening. They create the impression that a diet of steaks smothered in pork chops with appropriate trimmings has more to do with avoirdupois trouble than bread. Nicest part is you can still buy bread.

• *Ellenzweig's Bakery, Hamilton, Ont., has been using horses on delivery service since its establishment in 1906. But now it has replaced its steeds with modern panel trucks. For goodness sake, why?*

• Oysters 9 in. long were common along the American coast at the time the Pilgrims first settled, the Oyster Institute tells us. Some that size are still found, but they are usually of the wild type rather than the cultivated oyster developed by "farming" under water. That's civilization for you.

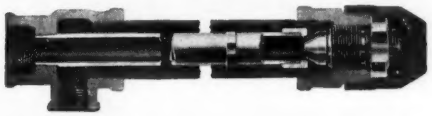
• *Borden's annual report tells about the continuing study of fresh concentrated milk and of the development of a product comparing favorably with the flavor of fresh milk. "A similar concentrate," they underline, "was originated by Gail Borden, the company's founder, and marketed by us for 88 years until 1945." About as well kept a secret as we've seen in a long time.*

• When on the march, General Washington's army received only hard bread and salt pork, according to the Army's 176th birthday report. And despite rolling kitchens, alphabet rations, n'everything, the marching men still take only one step at a time. Progress!

J.A.J.J.

ONLY 1 MOVING PART

in Nicholson Expansion Steam Traps



There is not a pin, not a bearing, not a link nor a lever to wear in this Nicholson expansion steam trap. The valve is the only moving part. This extreme simplicity is resulting in remarkably low maintenance costs. There are hundreds of instances of traps in continuous service for as much as two years without even a sign of valve cutting.

Appreciable fuel savings are also being effected. Traps are easily adjusted to pass condensate at any temperature below 212° F, instead of at near steam temperature.

Easily installed, often without supports. Lengths, 18" to 40". Pressures, 0 to 250 lbs. No air binding.

Remarkably Low Maintenance Costs Shown on Many Varied Installations

FOR ALL EQUIPMENT Using Steam or Hot Water

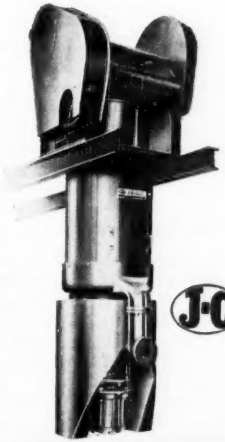
Cookers	Pasteurizers
Crystallizers	Preheat Tanks
Dryers	Rendering Tanks
Evaporators	Retorts
Heat Exchangers	Sterilizers
Juice Heaters	Washers
Kettles	Water Stills

Catalog 751 or see Sweet's

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

HAVING PRESSING PROBLEMS?

LET US HELP YOU AS WE HAVE HELPED THE FOLLOWING INDUSTRIES:



PAPER PULP: Ultra High Density bleaching-de-inking-concentrated black liquor recovery.

CANNERIES: Juice extractions from pulp.

VISCOSE: Optimum press ratios in continuously pressing alkali from cellulose.

CORN STARCH PLANTS: Dewatering germ and fibre.

POTATO STARCH PLANTS: Dewatering pomace.

RECLAIM RUBBER: Drier product (15 to 20% moisture). Low cellulose content.

GLUE PLANTS: Maximum grease recovery and drier pulp.

J-C

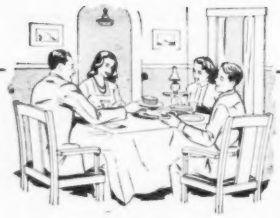
J-C ZENITH PULP PRESSES CONTINUOUS AND AUTOMATIC

Are stepping up profits through improved pressing efficiency. For applications to individual problems, for engineering or performance data, write Jackson & Church Company, Department D, at Saginaw, Michigan.

A PRODUCT OF

JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN

"Work well done since '81"

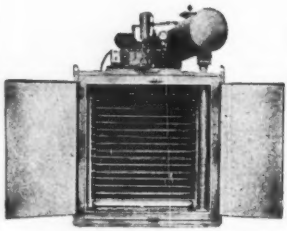


Consumer Preference
For the Uniform,
Perfect Package Is
Best Met by the

Amerio

CONTACT PLATE FREEZER

(Patent Applied For)



Model B 15 Station
Ammonia Type
Ready For Loading

The Most Adaptable
Freezer Made.

Fast
Economical
and
Full Quality Retention

AMMONIA BRINE FREON

Send For
New Illustrated Brochure

Amerio
Contact Plate Freezers Inc.
Union City, N.J.
"It's the Contacts that Count"

Sugar Field "Sled"

Propelling itself across muddy sugar cane fields without cutting up the soft grounds, this "walking sled" leaves fields and roots in condition to raise a second or ratton crop for the Hilo Sugar Co., in Hawaii. Successful experiments have also reduced hand cutting and fluming, thus cutting labor costs and operating time.

Hatch New Poultry Plant

A large new poultry plant is swinging into action near Salisbury, Md.

Built to accommodate more than 800,000 chickens and to market 80,000 ready-to-cook "spring chickens" a week, the new plant is a joint venture of Armour and Company, Hastings Hatchery, and Ches-Peake Quality Farms.

The plant has 17 poultry houses, each 620 ft. long and 48 ft. wide, plus a poultry dressing plant equipped with modern de-feathering, viscerating and packing machines, which prepare 2,000 chickens an hour.

Continuous research will also be conducted, at the new plant, on improved methods of mass producing choice poultry, utilizing and developing technics in poultry selection, and housing and feeding. The territory to be supplied includes all the eastern seaboard and some points as far west as Cleveland.

Well Fed Soldiers

American troops in Korea are being fed better than the GI's of World War II, Major Gen. Herman Feldman, Quartermaster General of the U. S. Army, told a meeting of the Associates, Food & Container Institute, in Washington last month.

General Feldman said the improved combat rations are due to newly developed techniques in processing, packaging and transportation of food products. Any food shortage has been due to the hazards of combat and the difficulty of transport in the Korea terrain, he added.

The nation's food suppliers and container makers were urged to step up development of new and better dehydrated foods since these foods are needed to save weight, conserve metal, and keep food usable. General Feldman would also like to see development of alternate packaging to save critical materials.

Because of the increasing dependence upon air supply, the search for more satisfactory types of packaging is important, and thus it is likely that flexible packaging will receive increasing emphasis. But, the General warned, there is yet much to learn about plastics and laminates for military shipping.

Egg Processors Schools

Processors and distributors of eggs and poultry in Maryland, Delaware, and the District of Columbia were introduced to the latest methods of handling these products in three one-night classes recently held at the University of Maryland.

The training classes, part of a series on food handling, were sponsored by the Poultry & Egg National Board, under contract with USDA. The department of agricultural economics and marketing of the University of Maryland Extension Service arranged the classes in cooperation with the University's Poultry Department.

The 75 processors and retail store personnel who attended put on aprons and went to work on preparation, packaging, daytime and overnight care, and special displays of eggs and poultry. Charles D. Hawks, Chicago, of the PENB staff, was instructor.

the 1st big reason why

Dowfume EB-15

is "Tops" for food machinery and spot fumigation

1. **Highly effective against all common pests of food processing establishments.**
2. **Low volatility.**
3. **Nonflammable.**
4. **Has a warning odor as a safety factor.**
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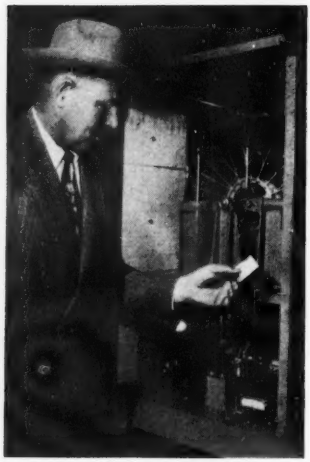

Livestock Weigher

This weight-checking system installed at the Chicago Union Stock Yards assures buyers and sellers of both accurate and recorded weights in their livestock transactions. Fred Hatch, president of the Chicago Livestock Exchange, is seen here looking over the scale's mechanism. (Wide World)

More Mexican Meat

Cattlemen of Mexico's San Luis Potosi region are preparing to build a large packing house to enable them to ship beef out of the country. Ing. Alfonso M. Jaimes of the government finance agency, Nacional Financiera, is planning director.

Mexico is expected to export 86,000,000 lb. of meat in 1951, as compared to 42,000,000 lb. in 1950, the two-fold increase due largely to the construction of several new packing plants, such as the San Luis Potosi proposal.

Total cattle slaughter in Mexico in 1950 was estimated at 2,300,000 head. However, the fear of aftosa (although no sign of the disease has appeared this year so far) still keeps a ban on export of live cattle or fresh meat to the U. S. This may possibly be lifted in 1952 if no cases break out in the future.

Cocoa Disease Cure

A new insecticide to be called "Hannane", developed by Pest Control Ltd. of Cambridge, England, gives hope that control of "swollen shoot" disease in important cocoa areas of the Gold Coast is within reach.

A research team has completed field

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The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use — both for freezing and for moderate temperatures — for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling — for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

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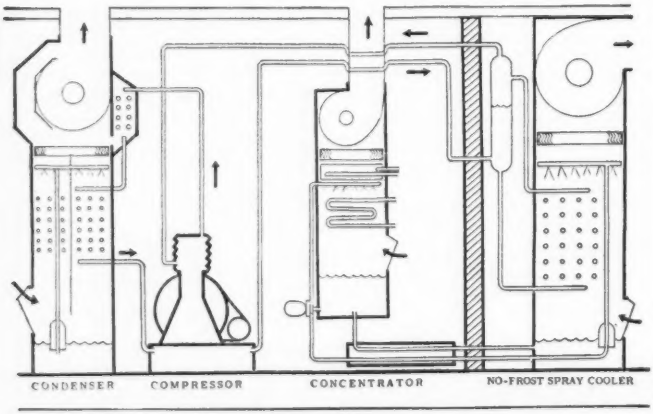

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experiments on 500 trees with encouraging results. The insecticide attacks the mealy-bug, the source of infection, but does not combat the resulting swol'en shoot virus, so that cutting out is still necessary. It is believed, however, that application of this insecticide together with cutting out of visibly infected trees will limit cuttings to one or two trees.

Experiments show a mortality rate of 99.95 percent of the insects, but owing to its poisonous nature, food crops in close proximity to the treated trees must be removed.

Can Desert Fruit

Canned fresh dates are coming off two Far West processing lines for the first time, with a total initial pack of 200,000 lb. This quantity, packed by Long's Date Gardens, Pasadena, and Desert Treasures, Tucson, follows a method developed in a cooperative project by the USDA and American Can Co.

Secret of the method lies in canning the dates without oxygen and pasteurizing them at 170 to 212 deg. F., according to Canco's Robert Ferren, of Los Angeles. Filled cans are immersed in hot water and kept there until heat penetration is sufficient to destroy microorganisms. Before canning the dates are specially treated for water content. California dates are generally hydrated in steam rooms overnight. Arizona dates, being rich in moisture, have to be dehydrated in dry heat.

Tests have showed the canned dates to be free from spoilage after prolonged storage at 90 deg F.

Up Coating, Down Cost

At least one candy plant has considerably increased savings by double-coating almonds with chocolate. As a result, each piece of candy has four parts chocolate to one part almond by weight.

At the time the practice was adopted, almonds were selling at from 70 to 75c. per lb., chocolate at around 30c. per lb.

Correction

In the article "Adjusts Freezer Space to Shipment" (p. 139, May, FE) the second sentence, fourth paragraph should have read: "This equipment replaces the tractor semi-trailer combination (used in most Midwest states), for it takes advantage of longer vehicle lengths and heavier axle and gross vehicle weights permitted in the Far West."

Who's In the Middle?

Pictured here is one reason why beef was making headlines during the past month. While ample stocks were fattening on farms and ranches across the country, waiting for the stabilization price structure to collapse, coolers in most packing plants were running out of carcasses. Who ever else was "in the middle" on this proposition, there can be no doubt that the packers were really squeezed. (Wide World photos)

Frozen Asparagus Improved

Blanching or scalding asparagus prior to freezing will greatly improve its color, flavor, and nutritive value, food scientists at the New York State Agricultural Experiment Station, Geneva, N. Y., have discovered.

Stalks up to $\frac{3}{4}$ in. in dia. should be blanched for 3 min. in boiling water, they found, or for $3\frac{1}{2}$ min. in flowing steam. Larger stalks should be submitted to a blanching period of 4 min. in boiling water or $4\frac{1}{2}$ min. in flowing steam. Blanching time is computed after the water comes back to a boil following the introduction of the asparagus.

Immediately after blanching, the stalks should be placed in ice water for rapid cooling, then packaged, frozen, and stored at 0 deg. F. or lower.

Sugar Board for P. R.

Puerto Rico's Governor Luis Muñoz Marin has approved legislation creating a sugar industry board of five members to regulate relations and contracts between sugar cane planters and sugar mills for grinding sugar cane. Procedure determining the percentage of sugar to be extracted from cane has been established and rules governing participation of planters

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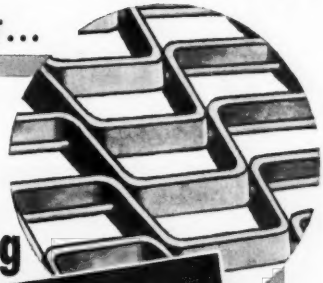

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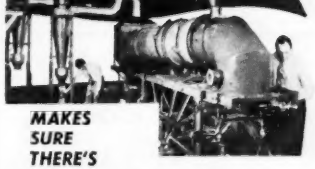

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and mills in molasses produced from cane have been outlined.

This law (S.B. 34) repeals an act of 1942 declaring sugar mills as enterprises of public service and regulating the sugar industry in Puerto Rico.

High Frequency Meat

Most practical use for electronic heating in meat processing, so far, has been in the defrosting of frozen pork bellies and similar products, according to F. E. Satchell, American Meat Institute Foundation.

However, effective sterilization has been obtained from a combination high frequency-steam process, and efforts are now being made to adopt dielectric heating to a continuous process for complete sterilization of pork luncheon meats without steam heating.

Spice Seed Ingredients

Poppy and caraway seeds used as ingredients rather than toppings are suggested by the Spice Trade Assn., a method having been developed by Miss Fritzi Swanstrom, the association's home economist. Both seeds are cooked for a few minutes before adding to the other ingredients in the recipe. Quick cooking softens the seeds and releases their flavor.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Oranges (California and Arizona), second revision, page 4419, May 12 *Federal Register*, effective June 11.

Sweet potatoes for canning, new, proposed, page 4467, May 12 *Federal Register*, written comments received until June 11.

Sweet potatoes for dicing or pulping, new, proposed, page 4467, May 12 *Federal Register*, written comments received until June 11.

Sulfured cherries, revised, page 4423, May 12 *Federal Register*, effective June 11; two minor corrections page 4802, May 23 *Federal Register*.

Apples, revised, proposed, page 4468, May 12 *Federal Register*, written comments received until June 11.

Edible sugarcane molasses, further proposed revision, page 4620, May 17 *Federal Register*, written comments received until June 16.

Shell eggs, Egg products, Live poultry, Dressed poultry, and *Ready-to-*

(*Turn to page* 173)

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cook poultry, proposed form of application and contract of agreement for grading service, pages 4659 to 4661, May 18 *Federal Register*, written comments received until June 17.

Orange marmalade, new, page 4746, May 22 *Federal Register*, effective June 21; two minor corrections page 5109, June 1 *Federal Register*.

Domestic rabbits, rules and U. S. specifications for grading and inspection, revised, page 5200, June 5 *Federal Register*, effective July 1.

Poultry, rules and U. S. specifications for grading and inspecting, revised, page 5210, June 5 *Federal Register*, effective July 1.

Dairy products, grading and inspection rules, revised, proposed, page 5280, June 5 *Federal Register*, written comments received until June 20 (revised regulations to be promulgated with July 1 effective date).

Extracted honey, correction, page 5313, June 6 *Federal Register* (refers to page 2463 of March 16 *Federal Register*).

Canned lima beans, correction, page 5390, June 7 *Federal Register* (refers to page 3607, April 27 *Federal Register*).

Nonfat dry milk solids, revised page 5420, June 8 *Federal Register*, effective July 8.

Canned sweet potatoes, third revision, page 5421, June 8 *Federal Register*, effective July 8.

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Poultry, official identification (authorized forms, designs, and wording), page 5423, June 8 *Federal Register*, effective July 1.

Almonds in the shell, new, proposed, page 5447, June 8 *Federal Register*, written comments received until July 8.

Shelled almonds, new, proposed, page 5448, June 8 *Federal Register*, written comments received until July 8.

Canned green beans and wax beans, fourth revision, proposed, page 5450, June 8 *Federal Register*, written comments received until July 8.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early June is reviewed below:

Policy Statements

1. *Imports and exports* within the jurisdiction of F&DA are regulated jointly with the Treasury Department. New regulations for the enforcement of section 801 of the Federal Food, Drug, & Cosmetic Act were promulgated on page 4921 of the May 25 *Federal Register*, effective on the day of publication.

2. *Monosodium glutamate and other hydrolyzed vegetable protein products* have been reviewed by F&DA. A new distinctive name, "hydrolyzed vegetable protein with reduced monosodium glutamate content", has been proposed by manufacturers and accepted by F&DA for that byproduct in the manufacture of purified monosodium glutamate from which a substantial proportion of the MSG has been removed. Percentage amounts of MSG, the total of other amino acid salts, sodium chloride, and water, if in liquid form, may be declared on the label if desired, in the order of decreasing percentages.

Hearings and Orders

No change since last reported (FOOD ENGINEERING, June 1951, page 217).

Schedule of Events

August

21–25—National Assn. of Sanitarians, 15th convention; Miami Beach, Fla.

September

6–7—Cornell University, 7th annual dairy industry conference; Statler Hall, Ithaca, N. Y.

10–14—Instrument Society of America, 6th national conference and exhibit; Sam Houston Coliseum, Houston, Tex.

19–21—University of Minnesota, dairy products institute; St. Paul Campus, St. Paul, Minn.

21–25—American Meat Institute, 46th annual meeting; Palmer House, Chicago.

30–Oct. 3—Tea Assn., annual convention; The Greenbrier, White Sulphur Springs, W. Va.

—*End*

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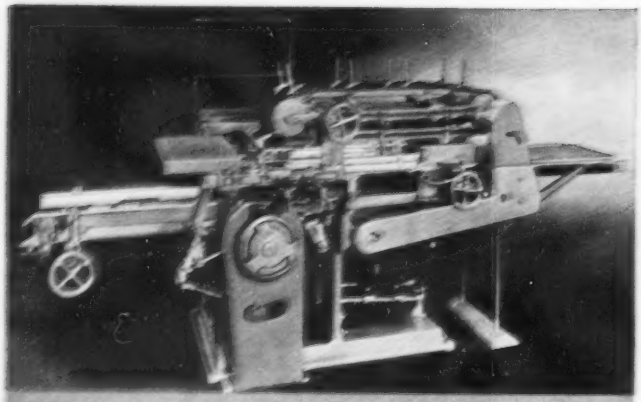

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Operating Under CMP

—Continued from page 156

user in reporting to NPA on the usage of the controlled materials allotted to him for this specific type of machine.

The manner of doing this is based on ordinary banking methods. Standard forms are used, each registered consumer being furnished by NPA with a Record of Allotments. This is the manufacturer's "check book." As the equipment is shipped, "checks" for the amount of controlled materials are sent to NPA. There a balance on a Memorandum Record of Allotments issued is kept of the controlled materials used by all consumers. In this way, over-authorization of allotments is prevented.

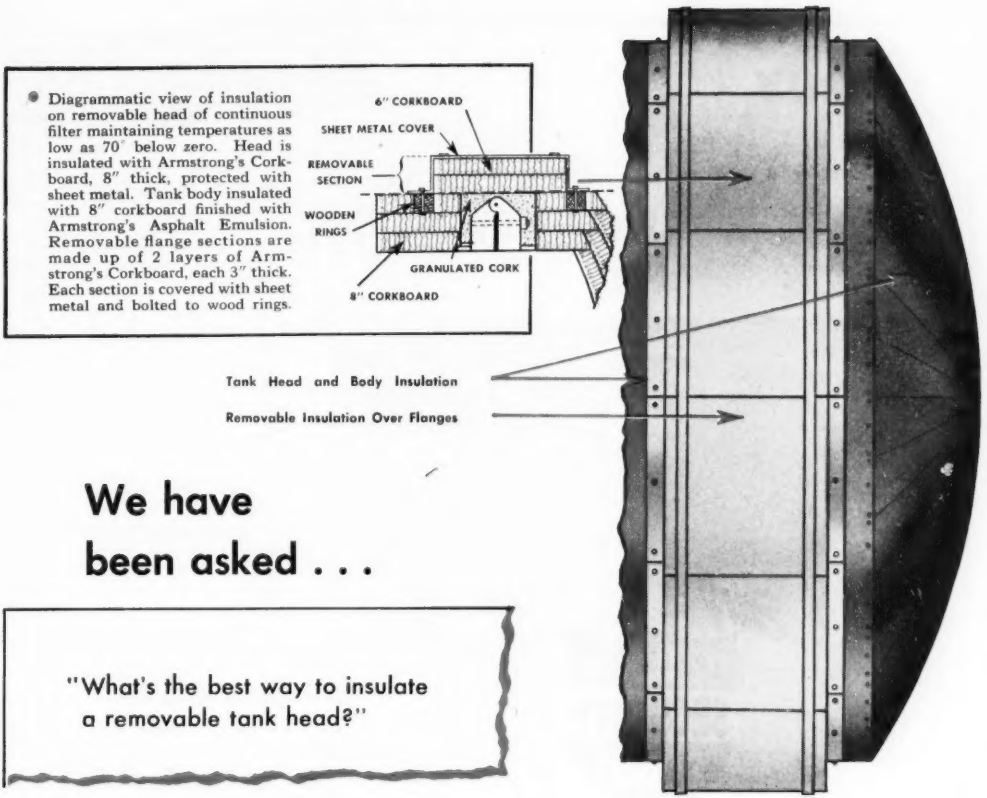
So the essential canner gets his filler, the manufacturer receives the necessary allotment of materials, and NPA has controlled the use of critical materials for essential users. This procedure must be followed during the emergency when defense and defense-supporting production agencies are taking high percentages of the basic materials. And it is to the best interests of processors to abide by the "red tape" regulations.

All expansion projects will be controlled in entirety by Agriculture under CMP Reg. 6 for food and fiber processing facilities construction, in addition to on-the-farm construction. Agriculture has received an allotment for this purpose and will both issue permits and allot materials.

There is one last point which the processor should bear in mind for full understanding of how CMP works. The processor will be awarded a DO rating but will not be given an allotment number or symbol. The latter applies only to the controlled materials which a manufacturer needs to build machinery. A processor who manufactures his own processing equipment in his own machine shops may obtain an allotment of controlled materials, and he will receive an allotment number with which to obtain those materials. However, he may find that he will need a DO rating before the mill or warehouse will honor his purchase order. This would occur only when all of the available materials are spoken for by DO ratings.

What About MRO?

The allotment of controlled materials claimed by Agriculture is the food industry's only provision for new construction, new machinery and maintenance, repair and operating supplies (MRO). The total amount of protection will be roughly equiva-



● Diagrammatic view of insulation on removable head of continuous filter maintaining temperatures as low as 70° below zero. Head is insulated with Armstrong's Corkboard, 8" thick, protected with sheet metal. Tank body insulated with 8" corkboard finished with Armstrong's Asphalt Emulsion. Removable flange sections are made up of 2 layers of Armstrong's Corkboard, each 3" thick. Each section is covered with sheet metal and bolted to wood rings.

We have been asked . . .

"What's the best way to insulate a removable tank head?"

"I want to insulate the removable head of a low-temperature filter tank," writes a plant engineer. "How can this be done so that the tank head can be taken off during cleaning without damaging the insulation."

To help maintain correct internal temperatures, we advised that Armstrong's Corkboard in the proper thickness be applied to both the tank body and head in hot asphalt or adhesive, and banded in place. To make the insulation removable over the flanges, it should be fastened on mechanically instead of with an adhesive. As illustrated in the drawing above, curved segments of Armstrong's Corkboard are built up and fitted around the flange. Each segment is covered with sheet metal for extra protection and easy removal. When they're bolted and banded on, the segments fit tightly, keeping heat away from the cold flanges and preventing condensation and frost damage.

SEND US YOUR QUESTIONS: If you have any questions involving the use or application of low-temperature or heat insulation, do not hesitate to call on us. We'll see that you get a practical answer. Just address a letter or post card to Armstrong Cork Company, 2307 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATIONS

MATERIALS - INSTALLATION

FOR ALL TEMPERATURES FROM 300°F. BELOW ZERO TO 2800°F.

BUY

all the U. S. Savings Bonds you can

☆

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and

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all the U. S. Savings Bonds you buy

lent to 90 percent of actual first-quarter usage in the above three groups. Thus any expansion in warehousing and processing facilities will leave less in the "kitty" for MRO.

Moreover, during the present deficit supply situation, there is little likelihood that the scramble of the consumer-durables manufacturers for the residual free market materials will leave much material in the open market for the food processor.

Accordingly, the DO-97 rating for MRO supplies is absolutely essential to protect the day-to-day operations of industry. It will itself be protected at a minimum level by Agriculture's allotment reserved under CMP. Processors will still be able to write their own tickets under CMP Reg. 5 (MRO), although the rules may be modified somewhat from NPA Reg. 2.

For instance, the upward MRO quota adjustment of 20 percent during June, 1951, was merely a temporary expedient needed to balance inflated values. CMP 5 is based on definite reserved quantities rather than fluctuating values. And MRO procurement under CMP should work as it originally was supposed to work under NPA-Reg. 2.

Immediate Outlook Dim

Although there is every good intention to protect the civilian economy, the military will get everything for which it asks. And for the third quarter of 1951, at least, it is hard to tell where food processors stand. Spot assistance, the method now being used to help deserving cases, must be continued until CMP gets going.

In the meantime, the controlled materials themselves pose a serious question. Only 15 percent of the nickel in the June melt was nonrated. Does this mean that essential civilian industries must share this scanty supply and be satisfied? M-14 is being amended to conserve nickel by restricting the use of nickel-bearing stainless steel to only the functional parts of machines. And "functional" is being defined as those parts in contact with food. The amount of copper available in the third quarter of 1951 is still a question.

Since the CMP program will take some time to get going, it would be naive to wait for CMP to help one's immediate supply problems. In some instances it may be impossible to get any help through CMP in the third quarter.

Therefore, decide your needs well in advance. Make the approach recommended above. And be content to wait for your equipment.

End (*Resume reading on p. 50*)

Pfizer's New Stabilized VITAMIN A

reduces overages

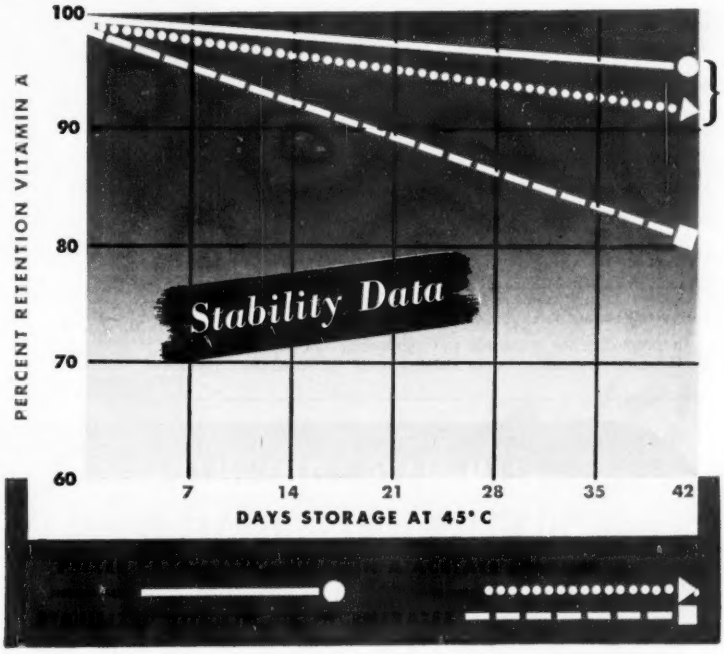
•

cuts costs

•

simplifies handling

•



Tests have established that Pfizer's new Crystalline Vitamin A Acetate, stabilized by a patented process, retains at least 90% of its potency after exposure equivalent to two years of shelf life in a temperate climate. It is no longer necessary to add excessive quantities of Vitamin A to insure compliance with standards throughout the shelf life of your product. You can *get up to 50% more production from the same number of Vitamin A units* you've bought in the past. And these dry granules are easier to handle, too . . . no undue precautions are needed.

Packaged in bottles and drums at a potency of 500,000 U.S.P. units per gram. Available in 3 mesh sizes. For complete information write to Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.

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Derived from pure Crystalline Vitamin A Acetate, this product has outstanding purity and high potency, making it ideal for use in oil solutions and aqueous dispersions. It is also particularly suited for the fortification of milk and other liquid products where taste is a factor. Packed in aluminum bottles under nitrogen at a potency of not less than 1,600,000 U.S.P. units per gram. Also available in oil solution at 1,000,000 U.S.P. units per gram.

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New, Quick, Cold-Water Dessert Mix

—*Continued from page 45*)

have been prepared with calcium salt solutions containing up to 500 ppm., expressed as calcium carbonate. This test is considered excessively severe. Magnesium ion, which is present in most hard waters, does not precipitate pectinates as readily as calcium ion. So little difficulty should be experienced from the water in most regions.

Here is The Recipe

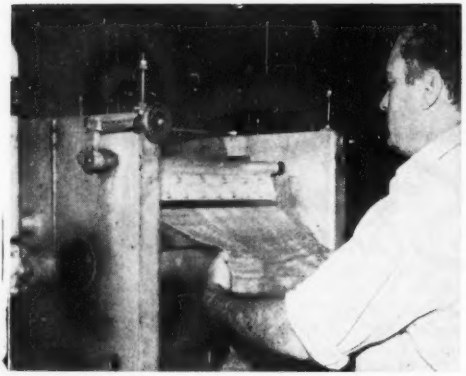
The recipe presented in Table III is recommended for a dry chocolate-flavored dessert mix. Mix and carefully grind these ingredients together so that they just pass 10 mesh, then package in water-resistant bags. When a pudding is to be prepared, add the dry mixture to 250 ml. (one cup) of cold water and stir rapidly with a household mixer or egg beater for about 2 min. Pour the creamy dessert into molds and let it stand 5 min. before serving.

TABLE III—Recipe for One-Package Gelled Dessert

Sucrose low-methoxyl pectin, 15:1 (drum-dried)	48g.
Sucrose	58.
Skim milk powder	30g.
Cocoa	10g.
Salt	1g.
Sodium carbonate (to give a pH of 6.8 to 7.1)	0.25g.
Vanillin and coumarin	To taste

Acknowledgment and References

In preparing the materials and conducting the drying experiments, the authors were assisted by S. I. Strashun, R. Mishima, M. E. Lazar, E. Breitweiser, R. P. Graham, A. L. Smith, and R. L. Patterson.



DRUM-DRYING low-methoxyl pectin-sugar mix in experimental unit at the WRRL Laboratory. Various pectin-sugar ratios were tried to determine the best.

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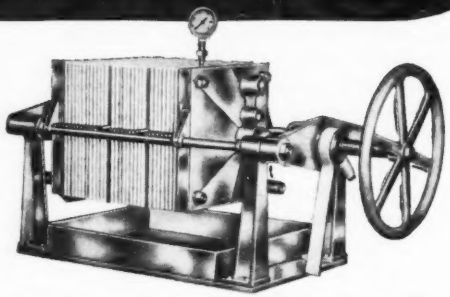

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Men & Companies

Industry

American Assn. of Candy Technologists has appointed a nomination committee for next year's officers, consisting of Waldemar Haug, Mason & Magenheimer Confectionery Co.; C. R. Kroekel, Kroekel-Oetinger, Inc.; and Charles Supplee, Frantz Candies, Inc.

Borden Co. has named Herbert H. Clarke, Jr., and Charles W. Niederauer as vice-presidents of the company's chemical division.

Cerveceria Andina, S. A., brewery of Bogota, Colombia, is preparing a $3,000,000 expansion program that is expected to triple the plant's present capacity.

Clapp's Baby Food Division, American Home Foods Inc., has completed an addition to its processing facilities, and is recalling an estimated 350 employees.

Coble Dairy Products, Inc., Lexington, S.C., has purchased the output of McLaurin Dairy at Dillon, S.C.

Consolidated Food Processors, Inc., is a newly named subsidiary of Consolidated Grocers Corp. The company will produce new types of food, including shrimp, processed by a new combination vacumizing-dehydrating method.

Farmers' Market, Atlanta, has been allocated $200,000 by Gov. Herman Talmadge for construction of a $400,000 milk-dehydrating plant. The additional $200,000 will be used for machinery for the new cooperative.

Dr. R. E. Greenfield has been elected vice-president in charge of manufacturing of A. E. Staley Manufacturing Co. He has been general superintendent of the firm since 1946, and a member of the board of directors since 1947.

Walter S. Mack, Jr., president of Phoenix Industries Corp., has purchased Nedick's Inc. Mr. Mack was until recently chairman and president of Pepsi-Cola Co.

Frigid Food Products Co., Detroit, has purchased the Avon Cannery, Avon, Wash. The plant, which has not been operated for some years, will initiate the new production this summer.

Golden State Packing Corp., Long Beach, Calif., has been purchased by F. E. Booth Co., Inc., San Francisco. Golden State's plant capacity of 300,000 cases annually will enable Booth to add sardines and mackerel to its packing operations. Tuna specialties will continue to be packed in the San Francisco plant.

Gulf Salt Co. is planning to offer its products on the home consumption market. Company operations were shut down for nearly a year, following a cave-in in 1949. But since production was resumed, plant capacity has been increased and a new warehouse erected.

H. J. Heinz Co. plans to construct a $135,000 warehouse in Huntington, W. Va., to serve southern West Virginia, southeastern Ohio, eastern Kentucky and western Virginia.

Kellogg Co. employees ended a 19-day strike May 21, accepting terms agreed upon by leaders and company officials. Included were some increases in overtime, insurance, and vacation benefits.

Kraft Foods Co., under an agreement with Sheffield Farms Co., has begun manufacture of Cheddar cheese at its Canton, N. Y. plant.

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Provides Accurate Low Cost Heat Control for liquids or air

Compressed air or water operated

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ACCRITEM REGULATOR

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Dependable—rugged construction of this heavy duty regulator insures many years of reliable service.

Size—regulator head is only 2⅞" x 3⅝", sensitive bulb is 12" long, diam. ¼" with ¼" I.P.S. connection.

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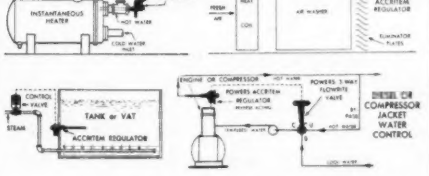

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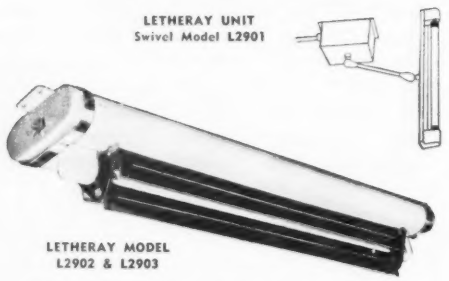

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Destroy spores and other micro-organisms which cause spoilage, right at the source, in the air. Hanovia germicidal lamps insure against loss of profits caused by product spoilage.

USED THROUGHOUT THE FOOD INDUSTRY WITH SATISFACTION

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Keith Giddings has joined the staff of C. J. Patterson Co. as director of sanitation. For the past three years, Mr. Giddings has been working with Dr. Edward L. Holmes, director of sanitation for the American Institute of Baking.

John Morrell & Co. has ceased meat processing operations at its Brooklyn branch. The firm will henceforth serve New York and Long Island accounts through direct plant-to-store delivery. Brooklyn accounts will be handled by route car operation.

The Pauli Packing Co., Portland, Ore., has started operation of its expanded custom smoking and curing plant for processing of meat, fish, and turkeys. Occupying 10,000 sq. ft. of floor space, the plant is provided with thermostatically controlled smoking equipment and includes smoke filtering and washing processes.

Buffalo Flour Mills, of Pillsbury Mills, Inc., received the National Safety Council's award for the best 1950 plant safety record in the food industry for two years of operation.

Swiss Colony Winery is building a $90,000 waste disposal plant, said to be the first of its type to be installed by a California winery.

Waffle Corp. of America is getting underway at its new Bristow, Okla., plant for processing and packaging frozen waffles.

Personnel

A. T. Augensen has been made manager of manufacture of the American Can Co.'s Pacific Division, succeeding C. F. Lausen, who was promoted to assistant general manager of manufacture in New York.

Linwood F. Brown has been appointed product manager for restaurant operations of General Foods Maxwell House Division. He was formerly a product manager in the company's Post Cereals Division in Battle Creek, Mich.

Russell J. Cameron, former vice-president in charge of sales, has been elected president of Ross Operating Valve Co., Detroit. He succeeds John Sainsbury, who will remain as active consultant member of the board of directors.

John S. Calvert is new president of Wood & Selick, Inc., succeeding the late Mr. Charles Triller.

Dr. John L. Etchells, USDA's food fermentation expert, has received a superior service award from USDA for his contribution to the development of fresh packed pickles, and for other research in the preservation of vegetables.

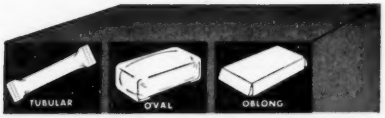
H. C. Ferguson, formerly of Oscar Mayer & Co., and recently general manager of Seeger Packing Co., Inc., Montgomery, Ala., has been elected vice-president and a member of the board of directors of that concern.

Paul S. Gerot, former corporate vice-president and company director of Pillsbury Mills, Inc., has been elected executive vice-president of the firm.

Clarence O. Hinsdale has been named vice-president and general manager of Frosty Morn Meats, Inc., Kinston, N. C.

Charles P. McCormick, president of McCormick & Co., Inc., Baltimore, has been appointed employer delegate for the U. S. to the International Labor Organization Conference for the third successive year.

Stuart A. Mitchell has been appointed manager of the northern California division of Golden State Co., Ltd. He formerly was manager of the company's manufactured products division.



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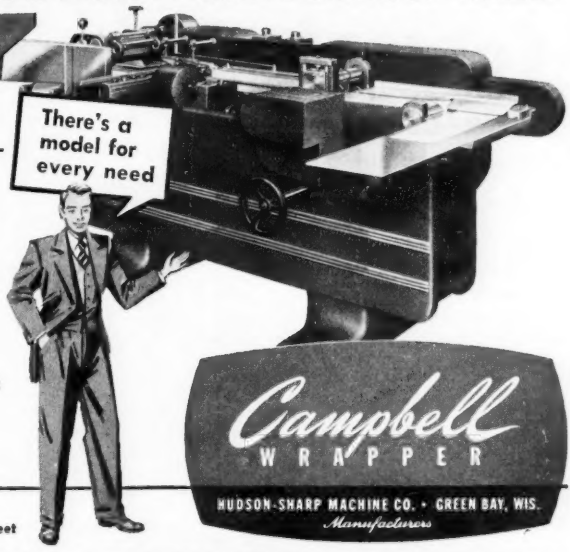

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The steam jacket on this Hamilton Tilting Kettle covers ⅔ of kettle area. Fabricated in stainless steel in gauges required by ASME Code or heavier. This kettle is available with single or double motion agitator with maple or nickel alloy scrapers—plus a Hydraulically lifted agitator arm. Any combination available upon specification.

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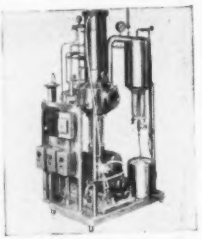
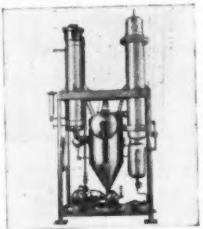


Mojonnier Laboratory Lo-Temp Evaporator, capacity 20 lbs. of water evaporated per hour. Floor space: 30" x 53" x 79" high, overall.

Since making the first commercial Lo-Temp installation for the citrus industry, Mojonnier has conducted an intensive research program, studying applications of this method to other food products.

Milk, coffee, pineapple juice, tomato juice and clam juice are some of the new concentrates developed. In addition to commercial installations, Mojonnier Pilot and Laboratory Model Lo-Temps are in use in leading plants the country over, providing a constant source of practical information on condensing methods and results.



Mojonnier Pilot Lo-Temp Evaporator. Capacity 120 lbs. of water evaporated per hour. Floor space: 42" x 66" x 108", overall.

If you have a condensing problem, let Mojonnier experience be your guide to profitable operation
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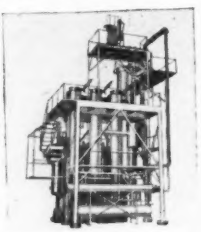

Mojonnier Lo-Temp Evaporator, commercial size.

Mojonnier
LO-TEMP EVAPORATORS

G. M. Robb has been named manager of Bemis Bro. Bag Co.'s textile bag and multiwall paper bag manufacturing plants at Houston, Tex.

Arthur W. Sigmund, general manager of cheese products for Kraft Foods Co., has been named president of the National Cheese Institute, succeeding W. J. Wilson of Swift & Co.

Dr. Edwin G. Stimson has been appointed assistant director for biochemistry, Division of Nutrition & Biochemistry of National Dairy Research Laboratories, Hopedale, L. I., N. Y.

John Wolf was elected president of the Southern Bakers Assn. at a recent meeting in Palm Beach, Fla. He succeeds Earl T. Colby of Jacksonville, who becomes chairman of the board. The affiliated salesmen's group elected J. Frank Reese, Atlanta, as president.

Hans J. Wolfisberg has been made vice-president of Nestlé's Chocolate Co., Inc. As special assistant to the president, he will be responsible for the company's relationships with the Nestlé headquarters in Switzerland, and other affiliated Nestlé companies. Mr. Wolfisberg has been with Nestlé's 24 yr.

Associated Industry

Allis-Chalmers Co. has re-elected W. A. Roberts president and elected as new vice-president Boyd S. Overlink, who has been serving as assistant to the vice-president in charge of the tractor division. J. F. Roberts and R. C. Allen have been appointed, respectively director of engineering and consulting engineer.

American Can Co. has named G. W. Reese general manager of manufacture. Mr. Reese succeeds S. D. Arms who was recently elected vice-president in charge of the company's Atlantic division. Other appointments: T. E. Alwin, as vice-president in charge of sales, and R. F. Hepenstal, as vice-president in charge of manufacture.

Batavia Body Co., recently conducted a two-day seminar to give customer-operators an explanation of the company's hydraulic refrigeration unit. In attendance were 25 service men from National Dairy Products Co.

Crown Can Co. has announced appointment of Harvey C. Tull to the post of general sales manager, with general supervisory duties over all sales divisions.

Herbert F. Marston has been named assistant general sales manager in charge of national sales of Kraft Salad Oil, which was recently put into national distribution. At a later date his duties will extend to other new Kraft products.

General Electric has appointed Dr. Lewis T. Radar assistant manager of engineering of General Electric's Control Divisions at Schenectady, N. Y. Dr. Radar was formerly head of the electrical engineering department at the Illinois Institute of Technology.

Olin Products Co., Inc., has recently been formed as a subsidiary of Ecusta Paper Corp., Pisgah Forests, N. C., for the distribution of cellophane in the packaging field. James L. Spencer was elected vice-president and director of sales of the new company.

T. Shriver & Co., Inc., announces officers of the company as follows: William L. Hutton, president; J. Lawrence Hutton, vice-president and treasurer; John H. Clark, Jr., vice-president and sales manager; and Herbert H. Flagg, secretary.

Deaths

Jacob J. Chouljian, 58, one of the founders of Peter Paul, Inc.

James C. Lee, 56, president of Buffalo Rock Bottling Co.—May 27.

John Franklin Pethybridge, 93, former manager of Armour Packing Co.—May 23.

William Carroll Van Clief, 67, president of Florida Citrus Exchange.—May 27

Howard Hill Wanzer, 82, president of Sidney Wanzer & Sons, milk company.—May 31. —*End*

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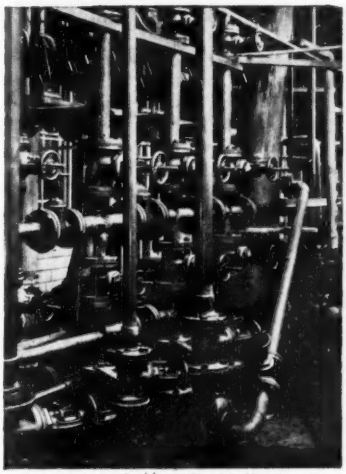
are standard

With science and skill, Brown-Forman Distillers Corporation carries on a famous Kentucky tradition of fine whisky. To insure uniform fineness in the flavor of Old Forester and its other whiskies, nothing is left to chance in the Brown-Forman distilling operations at Louisville.

Equipment for control of production is checked with the same meticulous care as grain samples, before approval. It is significant that Jenkins Valves, standard for years in all Brown-Forman distilleries, were again specified when plant facilities were expanded and modernized recently.

Significant, but not unusual. Jenkins Valves have been the choice *consistently* of the men who plan America's outstanding buildings. Future-minded, these men — architects, engineers, contractors — think of all operating equipment in terms of tomorrow's maintenance costs.

Jenkins builds *extra* endurance into valves — proved by low upkeep cost records in every type of service. Yet, despite this extra value, *you pay no more* for Jenkins Valves. For new installations, for all replacements, let the Jenkins Diamond be your guide to lasting valve economy. Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.



Among more than 3500 Jenkins Valves in Brown-Forman's Louisville plant are these which control the flow patterns through quadruple effect evaporators in the By-Products Building

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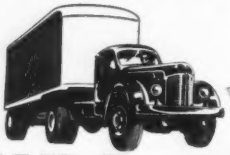

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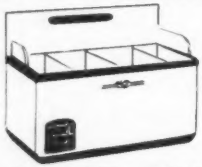

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Recent Inventions

Soluble Solids Recovered From Fruit Waste by Grinding, Digesting with Pectase, Coagulating Albumins, and Filtering—*C. S. Ash, San Francisco, Calif.* No. 2,530,322. Nov. 14, 1950.

Bread and Like Baked in Traveling Tray Oven With Dividing Wall Between Horizontal Compartment and Vertical Leg for Loading and Unloading—*E. H. Otto, Detroit, Mich.* No. 2,530,778. Nov. 21, 1950.

Whole Blood Solids and Blood Albumin Converted Into Protein Base Glues—*R. G. Peterson and G. R. Brieger to Balfour-Guthrie & Co., Ltd., Tacoma, Wash.* No. 2,530,780. Nov. 21, 1950.

Starch Separated From Gluten in Suspension of Ground Grain and Water by Fractional Screening—*A. K. Kilander, Gibraltar, and L. B. Edsall, Wyandotte, Mich., to Trenton Chemical Co., Trenton, Mich.* No. 2,530,823. Nov. 21, 1950.

Doughnuts Cooked During Continuous Flow Through Kettle Equipped With Receptacle to Trap Crumbs and Dough Particles—*P. J. Toews to Dough-King, Inc., Minneapolis, Minn.* No. 2,530,920. Nov. 21, 1950.

Vinegar Treated With Phytic Acid or Soluble Phytic Acid Salts and Filtered to Improve Color and Stability—*R. F. Cohee, Jr., Wheaton, Ill., to Corn Products Refining Co., New York.* No. 2,531,029. Nov. 21, 1950.

Macaroni Made in Automatic Manner in Continuous Dough Feed Machine—*S. Lenner, Milan, Italy.* No. 2,531,224. Nov. 21, 1950.

Cheese-Modifying Lipolytic and Proteolytic Enzymes Obtained From Edible Head and Neck Tissues of Milk-Fed Mammals—*M. G. Farnham, Calhoun Farms, Wis.* No. 2,531,329. Nov. 21, 1950.

Powdered Eggs Further Dried During Transfer Through Chamber of Gas and Subsequently Through Cooling Area With Gas of Low Moisture Content—*W. J. Patterson, La Grange, Ill., to Swift & Co., Chicago.* No. 2,531,343. Nov. 21, 1950.

Apples Prepared for Freezing by Slicing, Blanching With Live Steam, and Cooling in Solution of 0.2 to 2.0 Percent Calcium Salt—*C. H. Hills, Philadelphia, Pa., to USA.* No. 2,531,431. Nov. 28, 1950.

Fresh Fruits and Vegetable Treated With 10 to 400 ppm. Chlorine Solution to Inhibit Bacterial and Fungal Decay; 50 Percent of Chlorine in Free Form, Remainder as N-Chloro Amine—*D. E. Pryor, Whittier, and J. C. Baker, Monrovia, Calif., to Wallace & Tiernan Products Corp., Belleville, N. J.* No. 2,531,463. Nov. 28, 1950.

Canned Foods Sterilized During Passage Through Rotating Heat Exchanger in Manner to Cause Agitation of Contents—*H. L. Smith, Jr., Richmond, Va., to Chain Belt Co., Milwaukee, Wis.* No. 2,531,478. Nov. 28, 1950.

Ground Coffee Packaged in Sealed Bags Consisting of Non-Woven Fabric of Viscose Fibers Bound Together by Regenerated Cellulose—*L. H. Abrahams to Koffy-Pak Corp., Chicago.* No. 2,531,594. Nov. 28, 1950.

Melted Chocolate Cooled and Held at Desired Flowing Temperature While Falling Through Air-Cooled Spaces—*F. W. Greer, Belmont, Mass., to J. W. Greer Co., Cambridge, Mass.* No. 2,531,773. Nov. 28, 1950.

Noodles and Like Dried During Passage Through Compartment Under Automatic Control to Provide Cycle of Drying, Recovery, and Rest Phases—*L. Bettini, Rome, Italy.* No. 2,531,870. Nov. 28, 1950.

Crystalline Dextrose Made From Microbiological Enzyme-Converted Starch and Conversion Products—*L. Wallerstein to Wallerstein Co., Inc., New York.* No. 2,531,999. Nov. 28, 1950.

Pyrophosphate Baking Powder Given Improved Keeping Qualities by Inclusion of 7-75 Percent Calcium Carbonate—*W. E. Barch to Standard Brands Inc., New York.* No. 2,532,281. Dec. 5, 1950.

Protective Coating for Fruits Consisting of Water Solution of Propylene Glycol, Gelatin, and Gum Arabic—*C. S. Ferguson, Newton, Mass.* No. 2,532,489. Dec. 5, 1950.

Oleomargarine Packaged in Flexible, Translucent Container Adapted to Kneading to Distribute Coloring Material—*L. Peters, Evanston, Ill.* No. 2,532,513. Dec. 5, 1950.

Cakes Made With Liquid Triglyceride Oil as Shortening and Glycerol Monostearate as Emulsifying Agent—*L. G. Trempel, Decatur, Ill., and M. E. Frink, Tacoma, Wash., to A. E. Staley Mfg. Co., Decatur, Ill.* No. 2,532,523. Dec. 5, 1950.

Meat-Curing Ingredients Mixed With Water to Form Stiff Dough, Shaped Into Stick Form, and Dried to Hygroscopic Porous Solid

State—*T. D. Hill, Shreveport, La., to The Figaro Co., Inc., Dallas, Tex. No. 2,532,842. Dec. 5, 1950.*

Meat Packaged by Placing on Aluminum Plate and Wrapping as Unit—*J. G. Saunders, Silver Spring, Md. No. 2,533,051. Dec. 5, 1950.*

Protein Hydrolized With Excess Sulfuric Acid, Neutralized With Alkaline Earth Oxides and Hydroxides, and Treated With Soluble Sulfite at pH 5.5 to 7.5 to Permit Recovery of Glutamic Acid—*F. A. Hoglan, Toledo, Ohio, to International Minerals & Chemical Corp., Chicago. No. 2,533,114. Dec. 5, 1950.*

Essential Coloring Compounds Separated From Carmelized Water-Soluble Carbohydrate Material by Treating With Water-Soluble Alcohol and Solubility-Regulating Liquid With Boiling Point of 30 to 80 deg. C.—*J. E. Cleland and J. B. Longenecker, Granite City, Ill., to Union Starch & Refining Co., Columbus, Ind. No. 2,533,221. Dec. 12, 1950.*

Juice Extracted From Citrus Fruit Halves by First Forming Central Depressions Less Than Width of Fruit Leaving Juice Cells Adjacent to Rind Uncrushed and Subsequently Removing Juice From Uncrushed Cells by Circular Rubbing Action—*G. Cahill, Vero Beach, Fla. No. 2,533,350. Dec. 12, 1950.*

Freshly Broken Eggs Separated Into Yolks and Whites by Aid of Specially Designed Utensil Combination—*O. W. Groeber and W. McCord, Louisville, Ky., to Armour and Company, Chicago. No. 2,533,365. Dec. 12, 1950.*

Poultry Eviscerated by Aid of Tool Consisting of Flat Plate With Arcuate Ends and Centrally Disposed Back With Laterally Disposed Spaced Teeth Extended Outwardly—*L. Finney, Georgetown, Ill. No. 2,533,445. Dec. 12, 1950.*

Pectin Jelly of Low Sugar Type Consisting of Mixture of Two Pectinous Ingredients; One of Low, and Other of High Equivalent Weight Pectin in Smaller Quantity—*C. W. Kaufman, Tenafly, N. J., to General Foods Corp., New York. No. 2,533,471. Dec. 12, 1950.*

Tea Fed to Cutting Rollers and From Discharge Hopper Controlled to Prevent Clogging—*L. F. Blackwell, Wollaston, Mass., to Pneumatic Scale Corp., Ltd., Quincy, Mass. No. 2,533,550. Dec. 12, 1950.*

Chocolate, Cream, and Other Confectionery Paste Deposited by Casting Pistons and Complementary Casting Nozzles Fitted in Cylindrical Container to Prevent Sintering of Sugar Crystals—*K. C. S. Aasted, Gentofte, Denmark. No. 2,533,708. Dec. 12, 1950.*

Oil Expressed From Vegetable Proteinaceous Material by Continuous Pressure at Controlled Temperature—*F. W. Weigel, Fairview Village, Ohio, to The V. D. Anderson Co., Cleveland, Ohio. No. 2,533,858. Dec. 12, 1950.*

Chocolate Masses and Like Pulverized and Mixed by Action of Combination Stationary Outer Tank of Cylindrical Shape and Revolvable Inner Tank of Inverted Frusto-Conical Shape With Open Top and Bottom to Permit Circulation of Fluid Paste During Revolving Action — *E. Cavalieri to S. A. Macchine per l'Industria Dolciaria Carle & Montanari, Milan, Italy. No. 2,533,875. Dec. 12, 1950.*

Starch Recovered From Ground Degerminated Byproduct of Dry Corn Milling—*E. R. Darling, Muncie, Ill., and W. E. C. Yelland, Washington, D. C., to Lauhoff Grain Co., Danville, Ill. No. 2,534,249. Dec. 19, 1950.*

Pectin-Containing Fruit or Vegetable Slices Firmed by Active Pectase Solution—*C. H. Hills, Philadelphia, Pa., to USA. No. 2,534,263. Dec. 19, 1950.*

Citrus Juices Freed of Oil by Heating and Discharging Into Flash Chamber Under Sub-Atmospheric Pressure—*J. A. Cross, Westerville, Ohio, to Mojonnier Bros. Co., Chicago. No. 2,534,341. Dec. 19, 1950.*

Sugar Solution Purified by Liming and Subjecting to Action of Cation Exchange Material Operating in Hydrogen Cycle and Subsequently With Acid Absorbing Anion Exchange Material—*R. W. Shafor, Los Gatos, Calif., to International Minerals & Chemical Corp. No. 2,534,560. Dec. 19, 1950.*

Sucrose Solutions Inverted by Action of Hydrogen Zeolite at 40 to 75 deg. C.—*W. A. Blann, Stamford, Conn., to American Cyanamid Co., New York. No. 2,534,694. Dec. 19, 1950.*

Shrimps Beheaded by Action of Jets of Fluid Under Pressure—*C. A. Greiner and E. F. Greiner, New Orleans, La. No. 2,534,767. Dec. 19, 1950.*

Glutamic Acid With Little Contamination Recovered From Steffen Waste Water—*A. N. Bennett to The Great Western Sugar Co., Denver, Colo. No. 2,535,117. Dec. 26, 1950.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

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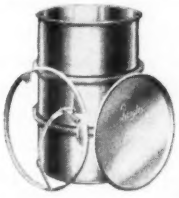

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Food Plant Equipment

Panels, Scales

Specifications of proportioning, blending units are given in well illustrated bulletin. Scales are described as of "pre-weighing" type (referring to delivery of prescribed amounts of material) as opposed to more familiar "post weighing" type (determination of weight of an unknown mass). Several examples of systems recently installed are given.—*O. S. Tyson & Co., Inc., New York 17.*

Crushers

Description and illustrations of horizontal sawtooth crushers and vertical cone type crushers appear in well-illustrated Catalog 46. 8 pages.—*Robinson Mfg. Co., Muncy, Pa.*

Zeolite Softener

Detailed explanation of sodium zeolite softening process with data necessary for laying out a zeolite water softening plant is given in Bulletin 4520. Pictures and diagrams of equipment and installations appear.—*Cochrane Corp., Philadelphia 32.*

Peracetic Acid

Data sheet presents analysis and applications of peracetic acid, one of newer bactericide-fungicides. It may be used as a germicidal wash for fruits and vegetables and for equipment sanitizing. 21 pages.—*Buffalo Electro-Chemical Co., Inc., Buffalo 7.*

Grain Dryer, Filter

Bulletin 92 pictures and describes grain dryer belt, filter press screen, oyster skinning table and washing basket—*Cambridge Wire Cloth Co., Cambridge, Md.*

Wool Insulation

Brief diagrammetric description of wool for cold storage insulation is offered in bulletin.—*Pacific Lumber Co., San Francisco 4.*

Vapor Vacuum Sealing

Subject of colorful 14-page catalog is method of pickle packaging using vapor-vacuum sealing. Seven major advantages of new method are reported.—*White Cap Co., Chicago.*

Grain Protectant

Non-toxic to humans and animals, powderlike grain protectant that is stated to prevent insect damage to unshucked, shucked or shelled corn is described in illustrated folder. Material is applied with hand scoop, shovel or duster. —*U. S. Industrial Chemicals, Inc., New York 17.*

Spray Nozzle Systems

Re-cooling spray nozzle systems for use in plants which operate condensers or use large quantities of water for cooling are diagrammed and described in 8-page Bulletin 6A-SP. Featured is a temperature graph giving cooling performance curves at specific nozzle pressures.—*Schutte & Koerting Co., Cornwallis Hts., Bucks County, Pa.*

Scale Feeder

New feeder which handles many different types of dry, ground and free-flowing materials, and insures accurate, economical feeding by weight is subject of 2-page leaflet.—*Wallace & Tiernan, Newark, N. J.*

Turbo Dryer

Leaflet describes vertical turbo unit for drying, sublimation, oxidation and cooling of fragile or heat sensitive materials, from thick slurries to fine powders. Illustrations and diagrams are included. 6 pages.—*Wyssmont Co., Long Island City, N. Y.*

Magnetic Separator

Detailed 15-page catalog lists, diagrams and illustrates variety of non-electric permanent magnets for inspection and removal of ferrous particles from foods. Charts give capacities and dimensions of each separator.—*Eriez Mfg. Co., Erie, Pa.*

Package Machinery

Treated briefly in 2-page leaflet are machines for wrapping frozen foods, crackers, and vegetables.—*Package Machinery Co., Springfield, Mass.*

Grain Applicator

For use in most concrete grain storages, new applicator described in Bulletin 8 is designed to facili-

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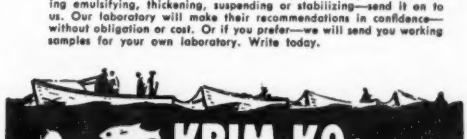

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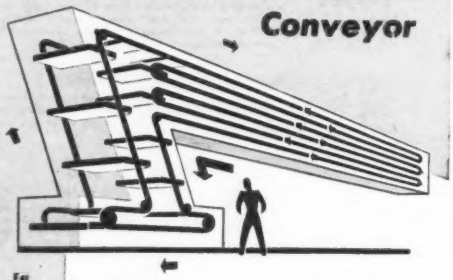

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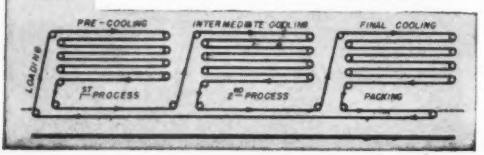

tate loading and reloading drums of fumigant. Mounting and preparation of drum is done at sides of conveyor belt. 2 pages.—*American Cyanamid Co., New York 20.*

Filters

Filters reputed to produce bacteria-free filtrate are presented with illustrations in 2-page bulletin.—*Hercules Filter Corp., Paterson, N. J.*

Control Equipment

Tachometer Indicators

Direct measurement of any speed between ½ rpm. and 100,000 rpm. without speed changing drive is function of new tachometer for wide speed ranges. Bulletin contains application, installation and servicing instructions.—*Metron Instrument Co., Denver, 9.*

Speed, Tension Controls

Assistance in selecting indicators, controllers and transmissions for regulating flow of continuously moving metallic and non-metallic materials is provided in 8-page booklet. Diagrams of mechanical systems for controlling speed and tension are included.—*Reeves Pulley Co., Columbia, Ind.*

Voltmeters, Ammeters

Series 500 recording voltmeters and ammeters are described in Bulletin E1111. Features of instruments are detailed with special emphasis on newly developed moving iron measuring mechanism.—*Bristol Co., Waterbury 20, Conn.*

Potentiometers

Electronic "continuous balance" operating principle as employed in potentiometer is stated to make instruments extremely accurate and responsive. Diagrams, illustrations and charts in 35-page catalog give details of operation.—*Minneapolis Honeywell, Brown Instruments, Philadelphia 44.*

Viscosity Indicator

Booklet of nineteen pages with accompanying pamphlets, describes and illustrates viscosity meter, counter rotating mixer, and other laboratory apparatus. — *Burrell Corp., Pittsburg 19.*

Speed Changer

Applications of Series 7 miniature speed changers are described and diagrammed in 2-page bulletin.—*Metrone Instrument Co., Denver 9.*

Temp Regulators

Illustrated with photos and cutaway drawings, 12-page Catalog 18 discusses mercury actuated instruments for temperature and regulation control.—*H. D. Instrument Co., Philadelphia 25.*

Centralized Controls

Single vertical scale units, multipoint indicator, selector valve, and remote manual relay are pictured and diagrammed in 2-page folder.—*Bailey Meter Co., Cleveland 10.*

Spectrophotometer

Photoelectric quartz spectrophometer for chemical research and process control has been adopted as the standard instrument for Vitamin A analysis, according to 10-page illustrated pamphlet. It may be used in analysis of butadiene, toluene and polyunsaturates in fatty acids.—*Beckman Instruments Inc., South Pasadena, Calif.*

Materials Handling

Hand Lift Trucks

Claimed for new single stroke hand lift truck, in 24-page catalog, are advantages of rear axle construction that provides a long Alemite greased bearing surface, roller bearing latch catch for positive engagement, lifting mechanism that is reported to lift load 25 percent easier, spring handle hold-up, and positive engagement of handle latch and lifting lever.—*Barrett-Cravens Co., Chicago 9.*

Transport Refrigeration

Information on refrigerated transportation of perishable cargoes is provided in 4-page bulletin. There are tips on how to spot and correct operational deficiencies, with simplified sketches.—*Hunter Mfg. Co., c/o Meermans Inc., Cleveland 14.*

Fork Lift Trucks

Tabloid size 8-page catalog features lift trucks for a variety of applications. Colorful illustrations appear with a minimum of text.—*Towmotor Corp., Cleveland 10.*

Tractor-Shovel

Payloader, a fast, compact, bulk material handling unit, is described with photos showing kinds of jobs where tractor-shovel is practicable.—*Frank G. Hough Co., Libertyville, Ill.*

V-Belt Drive

Listed in 12-page booklet with charts, diagrams and specifications are single or multiple V-belt drives for applications from fractional to 6000 hp. constant speeds, and to 300 hp. adjustable speed.—*Allis-Chalmers Mfg. Co., Milwaukee 1.*

Pilot Truck

Operating data and load rating chart for Model SD 20-24 lift truck are contained in 2-page leaflet.—*Buda Co., Harvey, Ill.*

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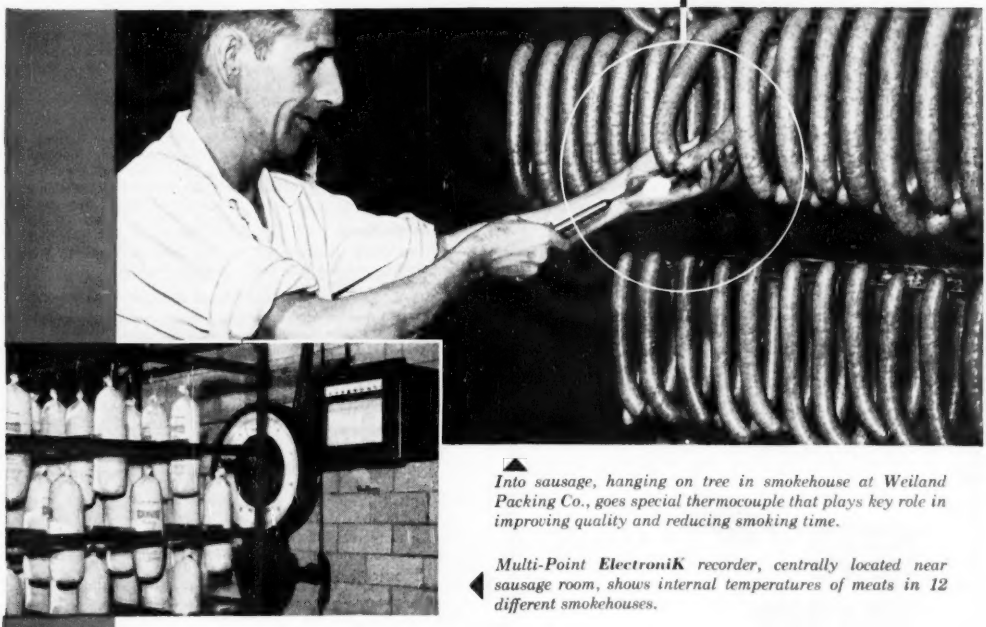

Into sausage, hanging on tree in smokehouse at Weiland Packing Co., goes special thermocouple that plays key role in improving quality and reducing smoking time.

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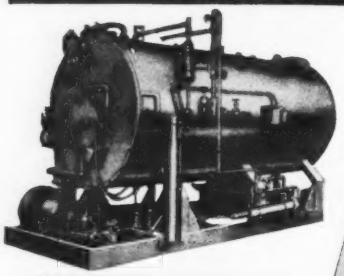

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Plant Supplies

Glass Pipe

Developed for dairy industry, glass pipe is reputed to reduce clean-up time and labor. Other advantages cited in descriptive leaflet are visual flow control, easy installation and low initial cost. 4 pages.—*Corning Glass Works, Corning, N. Y.*

Spraying Machine

Centrifugal spraying machine is designed to apply standard industrial coatings and finishes of from .0008 to .025-in. thickness. Bulletin shows operation of the unit, called the "gyromat," and diagram is included.—*Gyromat Corp., Fairfield, Conn.*

Nozzles, Flanges

Well-bound 72-page catalog lists and describes nozzles, welding necks and large diameter flanges. Charts giving dimensions of each item are included, also design sheets.—*Taylor Forge & Pipe Works, Chicago 90.*

Protective Coatings

Two protective coatings for ferrous metals are discussed in 4-page bulletin. Both are heat resistant, one to 1,600 deg. F, the other to 1,200 F. Coating is said to develop increasingly strong adhesion, actually penetrating granular structure of metal and acting as a filler.—*Dampney Co., Boston 36.*

Food Packaging

Different types of containers, including glass food jars, beer and soft drink bottles, and lithographed cans, are discussed in 56-page pocket-size booklet. Cost-saving packing operations, space saving, moisture fighting, and display ideas developed by leaders of industry are also pictured.—*Advertising and Publicity Associates, Milwaukee 2.*

Refrigeration Compressor

Detailed description of 2, 3, 5 and 7½ hp. hermetically sealed refrigeration compressors and condensing units are given in illustrated Bulletin 101-110.—*Westinghouse Electric Corp., Boston 26.*

Condensing Unit

Specifications and diagram of Worthington 6HF4 condensing unit for air conditioning and product and industrial refrigeration are featured in bulletin. Units are designed to occupy minimum space with minimum weight.—*Worthington Pump & Machinery Corp., Harrison, N. J.*

Speed Reducers, Couplings

Six-page booklet discusses application of speed reducers, couplings and gears in specific industries. Detailed diagrams and photos appear.—*Falk Corp., Milwaukee 8.*

Miscellaneous

Odor Control

Bulletin 502 outlines formulas to help food packers and canners stamp out obnoxious odors connected with production. Nature and origin of odors, especially as they relate to waste water systems and sewage and sanitation operations are particularized. 4 pages.—*Brooks Chemicals, Inc., Cleveland.*

Ice Handling Equipment

Fold-out type pamphlet itemizes and pictures variety of ice tongs, ice shavers, caulking bars and chisels and hooks.—*Gifford-Wood Co., Hudson, N. Y.*

Lighting

Report summarizes present day services of illumination in American industrial production, in public safety, in research and education, and in government. Charts, diagrams and graphs are included in 24-page catalog.—*National Information Committee on Lighting, Cleveland 13.*

Corn and Armed Forces

How products made from corn help fighting man keep fed, fit, clothed and armed is detailed in 8-page booklet. Medical, clothing and other needs made with corn products are itemized.—*Corn Industries Research Foundation, Washington, D. C.*

Plastic Products

Bulletin of 4 pages and supplemental sheets list a variety of transparent plastic products for the protection, preservation, and display of advertisements, artwork, sales-presentations, etc. — *Clear Vue Process Co., Brooklyn 20.*

Oil Additives

Fuel and penetrating oil conditioners are treated in 4-page color folder.—*Power Plant Products Co., Boston 10.*

Welding Appliances

Advantages of "cold bent" resistance welding electrodes and spray booth kits are indicated in 4-page bulletin covering various phases of welding.—*Ampco Metal, Inc., Milwaukee 46.*

Tape Dispenser

Suitable for cloth, paper, acetate, and fiber tapes, new general purpose pressure-sensitive tape dispenser, featured in 2-page bulletin, measures long strips (to 21 in., single stroke) of wide industrial tapes.—*Better Packages, Inc., Shelton, Conn.*

Floor Wax

A self-polishing, slip resistant liquid wax, suitable for use on all types of floors, is subject of 2-page bulletin.—*Tremco Mfg. Co., Cleveland 4.* —*End*

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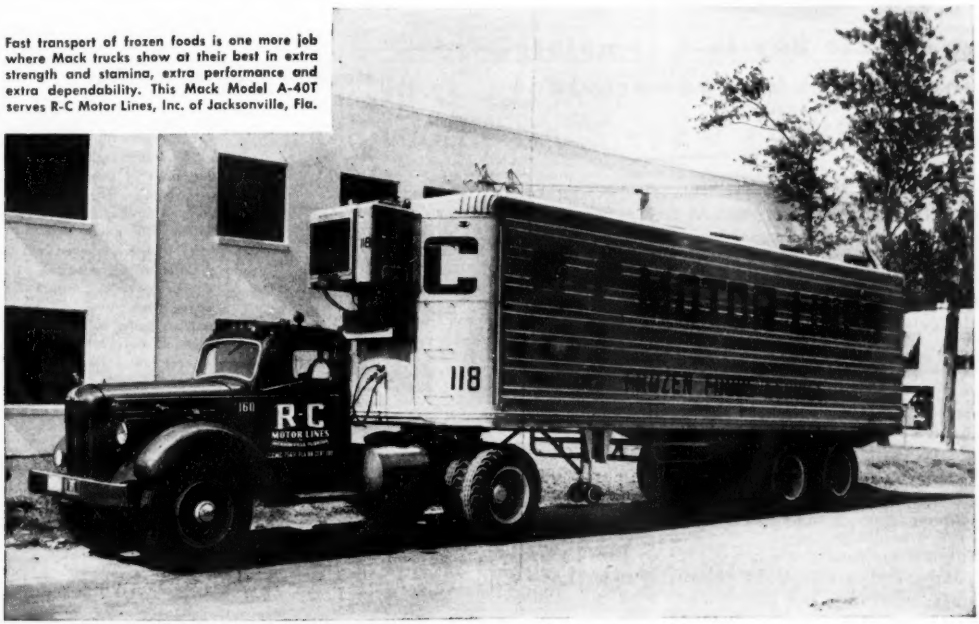
Fast transport of frozen foods is one more job where Mack trucks show at their best in extra strength and stamina, extra performance and extra dependability. This Mack Model A-40T serves R-C Motor Lines, Inc. of Jacksonville, Fla.



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For *your* machines, new or old, specify REEVES Speed Control and secure all the benefits of stepless speed adjustability. For full information, send for catalog No. FE64-G.

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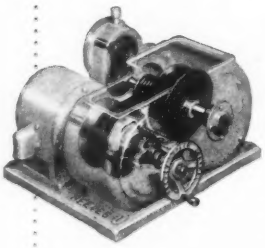

Phantom view of horizontal model with single reducer.

The Motodrive utilizes proved REEVES operating principle of a V-belt driving between two pairs of cone-shaped discs which are adjustable to form an infinite number of driving and driven diameters. Discs are mounted on parallel shafts. One shaft receives power at constant speed from motor—other delivers power at infinitely adjustable speeds to gear reducer from which desired speed is transmitted to driven machine.

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you don't want
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QUAKER CITY COLD STORAGE CO
PHILADELPHIA, PA
5 WAREHOUSES
Proper Temperature for Frozen Foods

New Advertisements

received by July 18th will appear in the August issue subject to limitation of space available. Address copy to the

FOOD ENGINEERING
330 W. 42nd St., New York 18, N. Y.

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For the Food Processor

CARROT OIL
makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Brood St., South Whitley, Ind.

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NEW ADVERTISEMENTS received by 10 A. M. July 18th at the New York Office, 330 W. 42 St., New York 18, N. Y., will appear in the August issue subject to limitations of space available

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

CHEMICAL ENGINEER: Large national firm in cereal field needs graduate chemical engineer with experience in food processing. Location in Minneapolis. Please state education and experience fully. P-9472, Food Engineering.

INDUSTRIAL ENGINEER — Excellent opportunity in I.E. Department of nationally known food company near Syracuse, New York. Engineering graduate preferred, 25 to 35 years old, 2 to 5 years experience. Send complete resume in confidence. P-9983, Food Engineering.

WANTED FOOD Technologist with exceptional educational background. Food experience preferred, not necessary requisite. Salary $4,000 to $6,000. Advise complete background experience and references. Position consists of research, quality control, and administrative duties. Answer P-9381, Food Engineering.

WANTED: MAN for managing salesmen on truck food distribution routes and buildings sales. Must be experienced in hiring and managing men. At present we operate seven trucks and expect to continually add more. This is a growing business and a wonderful opportunity for the right man. P-1054, Food Engineering.

FROZEN FOODS Foreman. Must be experienced. Knowledge of meat items will help. Mention pay. S. E. Mighton Co., Bedford, Ohio.

RESEARCH CHEMIST to originate staff and supervise research department. Must have food and drug experience. Excellent opportunity. Will discuss salary at interview. P-1141, Food Engineering.

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a. Mathematics and Chemistry of Food Technology
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c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to USDA standards
h. Mold Counting and Insect Examination

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GENERAL STUDY OF COOKING
PREPARATION OF SALADS
PIE AND PASTRY MAKING
CAKE DECORATING
STUDY OF MEATS

MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

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If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Foreladies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

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AGRICULTURAL EXPERT several degrees, long European and American experiences, seeks responsible position in research or food line. Excellent references. PW-1209, Food Engineering.

FOOD TECHNOLOGIST and Engineer with many years experience in Food Research and Engineering Developments. Creative ability and ingenuity to develop ideas and carry them through research, engineering, and production to sales. Two engineering degrees and Registered Professional Engineer. Articles published in Food Industries, Electronics and other technical magazines. Number of patents assigned to the firm where I am now employed. References above reproach from the highest executives. Prefer position in the south. PW-1113, Food Engineering.

HAVE EXPERIENCE in supervision and control of all canning operations in a large meat processing plant. B.S. Chemical Engineering. PW-9947, Food Engineering.

FOOD SPECIALIST: Production management, cost reduction, process improvement, successful research, products development, executive abilities. PW-1183, Food Engineering.

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BOTTLING LINE

consisting of 22 spout stainless steel H.S. Filler, 8 chuck U.S. Rotary Capper, 2 Economic Rotary World Labelers. Bottling speeds up to 140 per minute. All necessary conveyors, pumps and motors included.

BO-1071, Food Engineering
330 W. 42 St., New York 18, N. Y.

CONTRACT BOTTLING
WANTED

Have stainless steel rotary filler, screw capper, 2 labelers. Fully automatic, non-carbonated bottling line. Speeds up to 120 per minute. Will bottle on contract basis at reasonable rate.

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Mixer, ribbon type, 10'6" x 30" x 36" deep, double spiral, stay-bolted jacket for high pressure, with motor and reducer.

Mixer, J. H. Day, Double Sigma Blade—Size 6 Water jacket—Tilt Type with Motor

Reaction Kettle—30" dia. x 39" deep—S/S with G. E. Strip heaters, Insulated, cooling coil in kettle, agitator and covers, thermometers & recorder.

Tanks—S/S and Steel—All sizes to 3000 Gal.

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PHONE: CHesapeake 3-5300

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Citric - Tartaric - Phosphoric Acids
Vanillin, Coumarin, Glycols, Ethanolamines, Glycerine, Other Materials.

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Equipment must be less than five years old and in A-1 condition. In writing give full details, price, and where may be seen to

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At Real Low Prices — Immediate Deliveries

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International Stainless Steel Straightline 160/min. Vacuum Filler.
Resina S and LC Auto. Cappers.
New Way Wraparound Labeler.

Day and Robinson 100, 1000, 2400 lbs. Dry Powder Mixers and Sifters.

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Day, Ross Pony Mixers; 8, 15, 40 gal. caps.

B-P type 3500 gal. S.J. Double Arm Mixer.

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Whiz Packer B1, B2 Fillers.

Triangle Package Models G2C, G2S, G2C, N2CA and A6CA Elec-Tri-Pak Fillers.

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Filler 1, 2, 4 and 8 head Stainless Steel Automatic Piston Fillers, Rising Bed Feature.

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Stokes 90D Auto. Tube Filler and Closer.

Stokes, Colton Tube Filler and Closer.

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—FOR SALE—

2—#1 SH Mikro Pulverizers with motors.
1—#2 TH Stainless Steel Mikro Pulverizer.
2—Shriver Stainless Steel Plate & Frame Filter Presses, 12" x 12".
2—Sperry 24" x 24" Rubber-lined Filter Presses.
2—Shriver 36" x 36" Filter Presses, 25 and 36 Chambers.
1—Sparkler Stainless Steel Jacketed Filter, Model #33512.
1—Niagara Stainless Steel Filter, 146 sq. ft.
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UNION, N. J.
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2—Eimco 3'x1' Stainless Steel (316) Rotary Vacuum Filters.
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2—Buffovak 32"x100" Atmospheric Double Drum Dryers.
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4—Shriver 30", 24", 18", 12" P&F Filters.
1—Sperry 30" Aluminum P&F Filter Press.
2—Sperry 36", 24" wood Filter Presses, 28 chambers.
3—Shriver 24" and 12" P&F aluminum Filter Presses.
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1—Tolhurst 32" monel, Suspended Centrifugal.
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25—Stainless Kettles & Tanks, 20 to 500 gals.
12—Day, Robinson Powder Mixers, 200 to 5000#.
2—Stokes & Smith Model G-1 Powder Fillers.
3—Louisville 6'x50', 5'x25' Steam Tube Dryers.
8—Pfaudler 8000-gal. Sectional Glass-lined Tanks.

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BRILL EQUIPMENT COMPANY
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Telephone: Cypress 2-5703

FOR SALE
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Purchased in 1946; used four years until replaced by larger Bauer units. $500 each FOB Lexington, Kentucky, complete with 10 HP heavy duty motors and starters.

W. T. YOUNG FOODS, INC.
767 E. Third St. Lexington, Ky.

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LATE MODEL

PNEUMATIC SCALE CO. 35 Per Minute.
AUTOMATIC CARTONING LINE
Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer & Compression Unit.

PNEUMATIC High Speed Feeder & Bottom Sealer
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PNEUMATIC 90 spout automatic Vacuum Filler
PNEUMATIC SCALE CO. Tightwraps
PNEUMATIC SCALE CO. Inner Liners, large & small sizes
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PNEUMATIC Air Bottle Cleaner
CAPEM 4 Head Automatic Capper
RESINA Automatic Cappers, 1 and 2 Head
FILLER MACHINE CO. 2 and 4 spout Stainless Steel Piston Fillers
LEHMAN Automatic Bag Filler
TRIANGLE 3 station Elec-Tri-Pak Filler Model G2C with feed hopper, stainless steel
KARL KIEFER Rotary Vacuum Filler, 12 spout stainless steel
PNEUMATIC SCALE CO. Simplex Labeler
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DRIVER 2 Scale Net Weight Filler
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FRED GROAT Check Weighers
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POWDER MIXERS & SIFTERS 200 to 1000 lbs.
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2—Rotex Sifters, 40x84"; #11 20x48"; also Day #71 Stainless Steel "Roball" Sifters, single deck, 40"x84, m.d. with 2 HP, 3/60/220 volt motors.
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3—Mikro Pulverizers, Stainless Bantam, #1-F, #2-SI.
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Otto, we're getting compliments on our meat products these days.

Cooking has been a lot better, Mr. Tompkins, since you got those new Wear-Ever kettles*...

This is typical of the comments you hear in plants that convert to Wear-Ever Aluminum. Aluminum spreads heat so fast, so evenly, that vigorous boiling, slow simmering, or uniform browning are easy to achieve. In addition, you get faster cooking runs, and in the case of kettles, need only a low-pressure system. This economy on boilers and piping saves you money. A new, extra hard aluminum alloy sets new standards for durability—cuts maintenance costs. It will pay you to get full details on Wear-Ever Aluminum steam jacketed kettles and other food plant equipment. Mail the coupon to The Aluminum Cooking Utensil Company, 6707 Wear-Ever Building, New Kensington, Pa.

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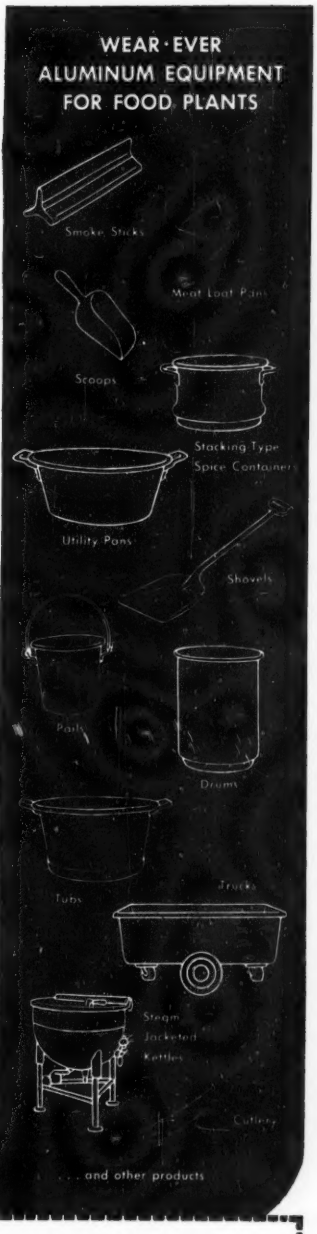

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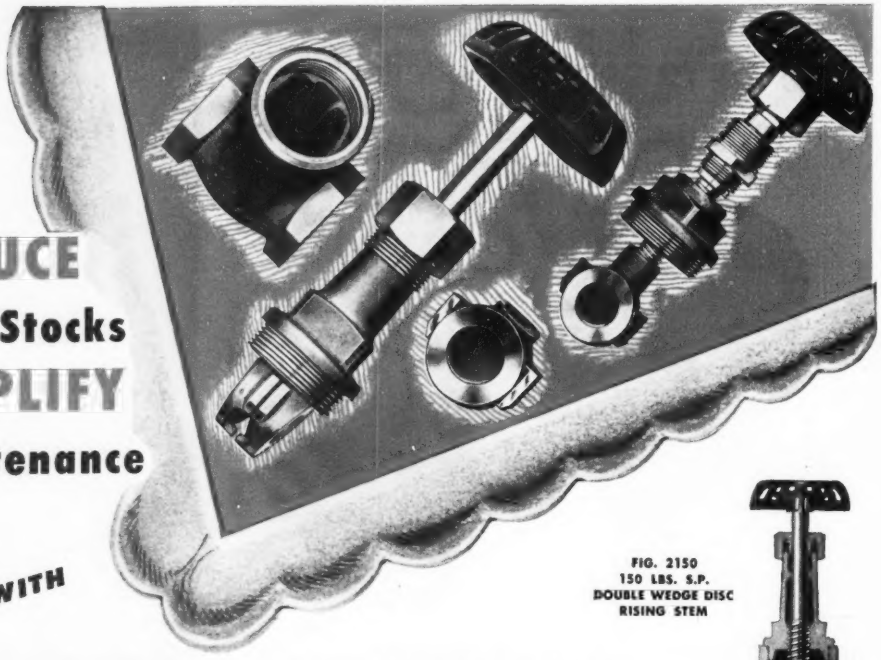

REDUCE
Your Stocks
SIMPLIFY
Maintenance

WITH

FIG. 2150
150 LBS. S.P.
DOUBLE WEDGE DISC
RISING STEM

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Threads and parts of the Fig. 2150 series are designed so that you can interchange bonnets and trim in seconds. Just spin the threads together, tighten, and your *converted* valve is ready for the toughest 150-lb. service.

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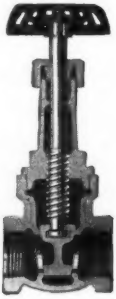

FIG. 2151
150 LBS. S.P.
SOLID WEDGE DISC
RISING STEM

FIG. 2153
150 LBS. S.P.
SINGLE WEDGE DISC
NON-RISING STEM

BRONZE • IRON • STEEL

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WHAT THE NUMBERS MEAN

Editorial Items: Numbers on postcard correspond with those in the index below.

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

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JULY, 1951

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